

MECHANICK
EXERCISES:
OR, THE
DOCTRINE
OF
Handy-Works.

Applied to the ART of JOYNERY.

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The Second Edition with Additions.

LONDON,

Printed and Sold by J. Moxon, at the *Atlas* in Warwick-Lane, 1694.



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MECHANICK EXERCISES:

O R,

The Doctrine of *Handy-Works*.

The ART of JOINERY.

Definition.

Joinery, is an Art Manual, whereby several Pieces of Wood are so fitted and joined together by straight Lines, Squares, Miters, or any Bevel, that they shall seem one intire Piece.

Explanation.

By *straight Lines*, I mean, that which, in Joyner's Language, is called a *Joint*, That is, Two Pieces of Wood are *Shot* (that is Plained,) or else they are *Pared*, that is, the irregularities that hinder the closing of the two Pieces are cut off with a *Paring Chisel*. They are *Shot*, or *Pared*, (as I said) so exactly straight, that when they are set upon one another, light shall not be discerned betwixt them. This they call *Shooting of a Joynt*, or *Paring to a Joint*, because these two Pieces are with Glew commonly joined together, either to make a Board broad enough for their purpose, or to (a) *Clamp* one piece of wood to the end of another piece of wood to keep it from *casting*, or *warping*.

By *Squares*, I mean the making of *Frames*, either for *Door-cases*, or such like, which is the Framing

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of two pieces of wood athwart two other pieces of wood, so as the four Angles of the *Frame* may comply with the *Square*, marked D.

By *Miters* are meant the joining of two pieces of wood, so as the Joint makes half a Square, and does comply with the *Miter Square*, marked E.

By a *Bevil* is meant any other Angle: As Frames that may be made of *Pentagon*, *Hexagon*, *Octagon*. &c. Figures.

§ 1. The Names of *Joiners Tools* described,
In *Plate III.*

A *A Work-Bench*. b The *Hook* in it, to lay Boards or other ^b *Stuff* flat against, whilst they are ^c *Trying* or *Plaining*. ^c The *Bench-Screw* (on its hither side) to *Screw* Boards in whilst the edges of them are *Plaining*. or ^d *Shooting*; and then the other edge of the Board is set upon a *Pin* or *Pins* (if the Board be so long as to reach to the other *Leg*) put into the *Holes* marked a a a a a down the *Legs* of the *Bench*; which *Pin* or *Pins* may be removed into higher or lower *holes*, as the breadth of the Board shall require: So then, the *Bench-Screw* keeps the Board close to the edge of the *Bench*, and the *Pins* in the *Legs* keep it to its height, that it may stand steady whilst the other edge is working upon: For in the *Shooting* of a *Joint*, if the Board keeps not its exact position, but shakes, or trembles under the *Plain*, your *Joint* will very hardly be truly straight. ^d The *Hold-fast*, let pretty loose into round holes marked b b b b b, in the *Bench*: Its office is to keep the work fast upon the *Bench*, whilst you either *Saw*, *Tennant*, *Mortefs*, or sometimes *Plain* upon it, &c. It performs this office with the knock of an *Hammer*, or *Mallet*, upon the head of it; for the *Beak* of it being

ing made crooked downwards, the end of the *Beak* falling upon the flat of the *Bench*, keeps the *Head* of the *Hold-fast* above the flat of the *Bench*, and the hole in the *Bench* the *Shank* is let into being bored straight down, and wide enough to let the *Hold-fast* play a little, the *Head* of the *Hold-fast* being knockt, the point of the *Beak* throws the *Shank* a-slope in the hole in the *Bench*, and presses its backside hard against the edge of the *Hole* on the upper Superficies of the *Bench*, and its Foreside hard against the oppposite side of the under Superficies of the *Bench*, and so by the point of the *Beak*, the *Shank* of the *Hold-fast* is wedged between the upper edge, and its oppposite edge of the round hole in the *Bench*. Sometimes a *double Screw* is fixed to the side of the *Bench*, as at g; or sometimes its farther *Cheek* is laid an edge upon the flat of the *Bench*, and fastned with an *Hold-fast*, or, sometimes, two on the *Bench*. e A Mallet.

§ 2. BBBBBBBB *Planes* of several Sorts: as,

B 1 A *Fore Plane*. a The *Tote*. b The *Mouth*. c The *Wedge*. d The *Iron*. e The *Sole*. f The *Fore-end*. g The *Britch*. f g h The *Stock*. All together A *Plane*. It is called the *Fore Plain* because it is used before you come to work either with the *Smooth Plane*, or with the *Joynter*. The edge of its *Iron* is not ground upon the straight, as the *Smooth Plane*, and the *Joynter* are, but rises with a *Convex-Arch* in the middle of it; for its Office being to prepare the Stuff for either the *Smoothing Plane*, or the *Joynter*, Workmen set the edge of it e *Ranker* than the edge either of the *Smoothing Plane*, or the *Joynter*; and should the *Iron* of the *Plane* be ground to a straight edge, and it be set never so little *Ranker* on one end of the edge than on the other, the *Ranker* end would (bearing as then upon a point) in

working, dig Gutters on the Surface of the *Stuff*; but this *Iron* (being ground to a Convex Arch) though it should be set a little *Ranker* on one end of its edge than on the other, would not make Gutters on the Surface of the *Stuff*, but (at the most but) little hollow dawks on the *Stuff*, and that more or less, according as the *Plane* is ground more or less arching. Nor is it the Office of this *Plane* to smooth the *Stuff*, but only (as I said) to prepare it, that is, to take off the irregular Risings, whether on the sides, or in the middle, and therefore it is set somewhat *Ranker*, that it may take the irregularities the sooner off the *Stuff*, that the *Smoothing Plane*, or the *Joynter*, may afterwards the easier work it *Try*. The manner of *Trying* shall be taught, when I come to Treat of the use of the *Rule*.

You must note, that as I told you in *Smithing*, Numb. I. fol. 14, 15, 16, it was the office of the *course tooth'd File* to take off the prominent irregularities the *Hammer* made in the *Forging*, &c. and that you were not to file them more away than you need, so the same Caution is to be given you in the using of this *Fore Plane* in *Joinery*, for the reason there alledged in *Smithing*, whether, to avoid repetition, I referr you; only with this consideration, that there *Iron*, or *Steel*, was the matter wrought upon, and there a *course File* the *Tool*; but now *Wood* is the matter, and a *Course*, or *Fore-Plane*, the *Tool*.

§. 3 Of setting the *Iron*.

When you set the *Iron* of the *Fore-Plane*, consider the *Stuff* you are to work upon, viz. Whether it be *hard*, or *soft*, or *Curling*, as *Joiners* call *Croze-grain'd Stuff*: If it be *hard*, or *curling*, you must not set the
Iron

Iron very *rank*, because a Man's strength will not cut deep into *hard wood*; and if it be not *hard wood*, but *curling*, or *knotty*, and the *Iron Rank-set*, you may indeed work with it till you come to some *Knot*, or *Curl*, but then you may either tear your *Stuff*, or break the edge of your *Iron*; therefore you may preceive a reason to *set* the *Iron fine* for *curling*, and *knotty Stuff*.

But if you ask me how *rank* your *Iron* ought to be set? I answer, If your *Wood* be *soft*, and your *Stuff free*, and *frowy*, that is, evenly temper'd all the way, you may *set* the *Iron* to take a shaving off the thickness of an old coined Shilling, but scarce thicker; whereas, if your *Stuff* be *hard*, or *curling*, or *knotty*, you shall scarce be able to take a shaving off the thickness of an old Groat. Therefore you must examine the Temper of your *Stuff*, by easy trials, how the *Plane* will work upon it, and *set* your *Iron* accordingly. And observe this as a General Rule, that the *Iron* a of the *fore-Plain* is, for the first working with it, to be *set* as *rank* as you can make good work with; and that for speed sake.

If your *Iron* be *set* too *rank*, knock with an *Hammer* upon the *Britch* of the *Stock*, and afterwards upon the *Wedge*; for this knocking upon the *Britch*, if you knock hard enough, 'twill raise the *Iron* little, and *set* it *fine*; if you knock not hard enough, you must knock again, till the *Iron* do rise; but if you knock too hard, it will raise the *Iron* so much, that its edge will rise above the *Sole* into the *Mouth* of the *Stock*, and consequently not touch the *Stuff*: therefore you must knock softly at first, till, by trials, you find the *Iron* rises to a convenient *fineness*. But as this knocking on the *Britch* raises the *Iron*, so it also raises and loosens the *wedge*; therefore (as aforesaid)

said) whenever you knock upon the *Britch*, you must also knock upon the *wedge*, to fasten the *Iron* again.

If you have raised the edge of the *Iron* too *fine*, you must knock softly upon the head of the *Iron*, and then again upon the *wedge*, and this you may sometimes do several times, till you fit your *Iron* to a convenient *fineness*.

When you have occasion to take your *Iron* out of the *Stock* to *rub* it, that is, to *whet* it, you may knock pretty smart blows upon the *Stock*, between the *Mouth* and the *Fore-end*, to loosen the *wedge*, and consequently the *Iron*.

These ways of *setting*, are used to all other *Plains*, as well as *Fore-planes*.

In the using of this, and indeed, all other *Planes*, you must begin at the hinder end of the *Stuff*, the *Grain* of the wood laying along the length of the *Bench*, and *Plain* forward, till you come to the fore-end, unless the *Stuff* proves *Cross-grain'd*, in any part of its length; for then you must turn your *Stuff*, to *Plain* it the contrary way, so far as it runs *Cross-grain'd*, And in *Plaining*, you must, at once, lean pretty hard upon the *Plane*, and also thrust it very hard forwards, not letting the *Plane* totter to, or from you-wards, till you have made a *Stroak* the whole length of the *Stuff*. And this sometimes, if your *Stuff* be long, will require your making two or three steps forwards, e'er you come to the fore-end of the *Stuff*: But if it do, you must come back, and begin again at the farther end, by the side of the last plain'd *Stroak*, and so continue your several lays of *Plaining*, till the whole upside of the *Stuff* be plain'd.

And if the *Stuff* be broad you are to *Plain* upon, and it *warp* a little with the *Grain*, or be any ways crooked

crooked in the breadth, you must then turn the *Grain* athwart the *Work-Bench*, and Plane upon the *Cross-Grain*. For, if your work be hollow in the middle, you must Plain both the Bearing sides thinner, till they come to a *Try* with the middle. Then turn the other side of your work, and working still *Cross-grain'd*, work away the middle, till it come *Try* with the two sides.

This way of *Cross-Grain'd* working, is, by Workmen, called *Traversing*.

Thus have you, in general, the use of all the other *Planes*: But the use of those *Planes*, that are designed for other particular purposes, I shall shew, as they come in Order.

§ 4. Of the *Joynter*. B 2.

The *Joynter* is made somewhat longer than the *Fore-plane*, and hath its *Sole* perfectly straight, from end to end. Its office is to follow the *Fore-plane*, and to *shoot* an edge perfectly straight, and not only an edge, but also a Board of any thickness; especially when a *Joynt* is to be *shot*. Therefore the Hand must be carried all along the whole length, with an equal bearing weight, and so exactly even, and upright to the edges of the Board, that neither side of the *Plane* encline either inward or outwards, but that the whole breadth be exactly square on both its sides; supposing its sides straight: so will two edges of two boards, when thus *shot*, lie so exactly flat and square upon one another, that light will not be discerned betwixt them. But yet it is counted a piece of good workmanship in a *Joyner*, to have the craft of bearing his hand so curiously even, the whole length of a long Board; and yet it is

is but a sleight to those, Practice hath inur'd the Hand to. The *Joynter* is also used to *Try* Tables with, (large or small) or other such broad work; and then *Joyners* work, as well upon the *Traverse* with it, as with the Grain of the Wood, and also Angularly, or Corner-wise, that they may be the more assur'd of the flatness of their work.

Its *Iron* must be set very *fine*, so fine, that when you wink with one Eye, and set that end the straight side of the *Iron* is next to the other Eye, there appear a little above an hairs breadth of the edge above the superficies of the *sole* of the *Plane*, and the length of the *edge* must lie perfectly straight with the flat breadth of the *sole* of the *Plane*: For the *Iron* being then well wedg'd up, and you working with the *Plane* thus set, have the greater assurance that the *Iron* cannot run too deep into the *Stuff*, and consequently you have the less danger that the *Joynt* is wrought out of straight.

§ 5. The Use of the *Strike-block*.

The *Strike-Block* marked B 3. is a *Plane* shorter than the *Joynter*, having its *sole* made exactly flat, and straight, and is used for the *shooting* of a short *Joynt*; because it is more handy than the long *Joynter*. It is also used for the framing, and fitting the Joints of *Miters* and *Bevels*; but then it is used in a different manner from other *Planes*: For if the *Miter* and *Bevel* you are to fit be small, you must hold it very steady in your left hand, with the *Sole* of it upwards, and its fore-end towards your right hand: and you must hold your work in your right hand very steady: Then apply the sawn *Miter*, or sawn *Bevel* end of your *Stuff*, to the fore-end of the *Strike-Block*,

Block, and so thrust it hard and upright forwards, till it pass over the edge of the *Iron*, so shall the edge of the *Iron*, with several of these thrusts continued, cut, or plain off your *stuff* the roughness that the *Teeth* of your *Saw* made: But if your work be so big that you cannot well wield it in your right hand, you must set the end of your work in the *Benck-screw*, and Plain upon it with a *smoothing Plane*.

§ 6. *The Use of the Smoothing-Plane.*

The *Smoothing-Plane* marked B 4. must have its *Iron* set very *fine*, because its Office is to smoothen the work from those Irregularities the *Fore-Plane* made.

§ 7. *The Use of the Rabbet-Plane.*

The *Rabbet-Plane* marked B 5. is to cut part of the upper edge of a Board, or other *Stuff*, straight, that is, square down into the Board, that the edge of another Board also cut down in the same manner, may fit and join into the Square of the first board thus cut away: And when two Boards are thus *lapped* on the edges over one another; this *lapping* over is called *Rabbetting*.

The *Rabbet-Plane* is also sometimes used to strike a *Facia* in a piece of *Molding*; as shall be shewed in its proper place.

The sides of the *Iron* are not inclosed in the *Stock* of this *Plane*, as the fore-going *Planes* are, but the *Iron* is full as broad as the *stock* is thick, that the very angles of the edge of the *Iron* may not be born off the *stuff*, to hinder the straight and square cutting it down: nor doth it deliver its shaving at a

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Mouth on the top of the *Stock* as the other *Planes* do : But it hath its *Mouth* on the sides of the *Plane*, and delivers its shavings there. Its *Iron* is commonly about an Inch broad.

§ 8. *The Use of the Plow.*

The *Plow* marked B 6. is a narrow *Rabbit-Plane*, with some additions to it: viz. two square *Staves*, marked *aa* (yet some of them have the upper edges of them rounded off for the better compliance with the Hand.) These *Staves* are let stiff through two square *Mortises* in the *stock*, marked *bb*. They are about seven or eight inches long, and stand straight and square on the farther side of the *stock*; and these two *staves* have sholders on the higher side of the *stock*, reaching down to the wooden *sole* of the *Plane*, (for there is also an *Iron sole* belonging to the *Plow*.) To the bottom of these two Sholders is, Rivetted with Iron Rivets, a *Fence* (as workmen call it) which comes close under the *Wooden sole*, and its depth reaches below the *Iron sole* about half an Inch: Because the *Iron* of the *Plow* is very narrow, and the sides of it towards the bottom are not to be inclosed in the *stock*, for the same reason that was given in the *Rabbit-Plane*; therefore upon the *stock* is let in, and strongly nailed, an Iron Plate of the thickness of the *Plow-Iron*, for Wood of that breadth will not be strong enough to endure the force the lower end of the *Plow-Iron* is put to: This Iron-Plate is almost of the same thickness that the breadth of a *Plow-Iron* is. Joiners have several *Plows*, for several widths of *Grooves*.

The Office of the *Plow* is, to plow a narrow square *Groove* on the edge of a Board; which is thus perform'd. The Board is set an edge with one end in the *Bench-screw*,

screw, and its other edge upon a Pin, or Pins, put into a Hole, or Holes, in the Leg, or Legs, of the Bench, such an Hole, or Holes, as will, most conveniently for height, fit the breadth of the Board: Then the *Fence* of the *Plow* is set to that distance off the Iron-Plate of the *Plow*, that you intend the *Groove* shall lie off the edge of the Board: As if you would have the *Groove* lie half an Inch off the Board, then the two *staves* must, with the *Mallet*, be knocked through the *Mortesses* in the *Stock*; till the *Fence* stands half an Inch off the Iron Plate; and if the *staves* are fitted stiff enough in the *Mortess* of the *stock*, it will keep at that distance whilst you plow the *Groove*: For the *Fence* (lying lower than the *Iron* of the *Plane*) when you set the *Iron* of the *Plow* upon the edge of the Board, will lie flat against the farther edge of the Board, and so keep the *Iron* of the *Plow* all the length of the Board at the same distance, from the edge of the Board that the *Iron* of the *Plow* hath from the *Fence*. Therefore your *Plow* being thus fitted, plow the *Groove* as you work with other *Planes*, only as you laid hold on the *stock* of other *Planes* when you use them, now you must lay hold of the two *staves* and their *holders*, and so thrust your *Plow* forwards, till your *Groove* be made to your depth.

If the *Staves* go not stiff enough in the *Mortess* of the *Stock*, you must stiffen them, by knocking a little wooden wedge between the *Staves* and their *Mortesses*.

§ 9. Of Molding-Planes.

There are several other *Planes* in use amongst Joiners, called *Molding-planes*; as, the *Round*, the *Hollow*, the *Ogee*, the *Snipes-Bill*, the *Rabber-plane*, the *Grooving-plane*, &c. And of these they have several sorts, viz. from Half a quarter of an Inch, to

an Inch and a Half. They are used as other *Planes* are. In the Planeing of Stuff, you must use *Planes* whose *Irons* have different Mountings; and that according to the hardness, or softness of the Wood, you are to work upon: For if the wood be hard, the *Iron* must stand more upright than it need do, if the wood be soft: For soft Wood, as *Deal*, *Pear-tree*, *Maple*, &c. The *Iron* is set to make an Angle of 45 degrees, with the *Sole* of the *Plane*: But if it be very hard wood you are to Plain upon, as *Box*, *Ebony*, *Lignum Vita*, &c. It is set to 80 degrees, and sometimes quite upright: so that these hard Woods, are, indeed, more properly said to be Scraped, than Plained.

But before you come to use your *Planes*, you must know how to grind, and whet them, for they are not so fitted when they are bought, but every Workman accommodates them to his purpose, as if it be an hard wood he is to work on, he grinds his *Basil* to a more obtuse Angle, than he would do for soft Wood.

The *Basil*, or Angle, an *Iron* is ground to, to work on soft Wood is about 12 Degrees, and for hard wood about 18, or 20 Degrees. Where note, That the more accute, or thinner, the *Basil* is, the better and smoother the *Iron* cuts, and the more obtuse and thicker, the stronger the Edge is to work upon hard Work.

§. 10. Of Grinding and Whetting the *Iron*,
and other Edge-Tools.

When you grind your *Iron*, place your two Thumbs under the *Iron*, and your Fingers of both hands upon the *Iron*, and so clap down your *Iron* to the stone, holding

ing it to that Angle with the *Stone* you intend the *Basil* shall have: keep the *Iron* in this posture, without either mounting, or sinking, its ends all the while the *Stone* is turning about; And when you lift the *Iron* off the *Stone*, to see if it be ground to your mind; if it be not, you must be sure you place the *Iron* again in the same position on the *Stone* it had before; for else you will make a double *Basil* on your *Iron*: But if it be true set on the *Stone*, and steddily kept to that Position, your *Basil* will be *Hollow*, and the smaller your *Grind-stone* is, the hollower it will be. You may know when it is well Ground, by the evenness, and entireness of the edge all the way.

Having ground your *Iron*, you must smoothen the edge finer with a good fine *Whet-stone*. Thus, hold the edge of your *Iron* upwards in your left hand, and your *Whet-stone* in your right, and having first spit upon your *Stone* to wet it, apply it to the *Basil* of your *Iron*, in such a Position, that it may bear upon the whole breadth of the *Basil*; and so working the *Stone* over the *Basil*, you will quickly wear the courser grating of the *Grind-stone* off the edge on that side: Then turn the flat side of the *Iron*, and apply the *Stone* flat to it, till you have worn off the course gratings of the *Grind-stone*, on that side too.

Joiners often grind their *Irons* upon a flat *Grind-stone* also: And then they hold the *Iron* also in their hands, in the same posture as if it were to be ground on the *Round Grind-stone*: yet then instead of keeping the *Iron* on one place of the *Stone*, they thrust it hard straight forwards, almost the length of the *Stone*, and draw it lightlier straight back again, keeping it all the while at the same Angle with the superficies of the *Stone*; and then smoothen its edge
with

with the *Whet-stone*, as if it had been ground upon the round *Grind-stone*. And this they do so often, till they have rubbed the hollownes of the *Basil* to a flat, and then they grind it again upon the round *Grind-stone*.

This Order and Manner of *Setting*, *Grinding* and *Smoothing* a *Basil* and *Edge*, is also used in all other *Edge-Tools* *Joiners* use.

§ 10. Of Chissels of several Sorts.
And first of Formers.

Formers marked C 1, C 3, are of several sizes. They are called *Formers*, because they are used before the *Paring-Chissel*, even as the *Fore-Plane* is used before the *Smoothing-Plane*. The *Stuff* you are to work upon being first scribed, (as I shall shew in its proper place) you must set the edge of the *Former*, a little without the scribed stroak, with its *Basil* outwards, that it may break, and sholder off the Chips from your Work, as the *Edge* cuts it. And you must bear the *Helve* of the *Former* a little inwards over the *Stuff*, that the *Former* do not at first cut straight down, but a little outwards: For, should you venter to cut straight down at the first, you might with a negligent or unluckly knock with the *Mallet*, drive the edge of the *Former* under the work, and so cut, before you are aware, more off the under side than the upper side of your work, and so (perchance) spoil it. Therefore you may make several cuttings, to cut it straight down by little and little, till your work is made ready for the *Paring-Chissel*. When it is used, the *Helve* of it is knockt-upon with a *Mallet*, to drive the edge into the *Stuff*.

§ 11. Of the Paring-Chissel.

The *Paring-Chissel* marked C 2. must have a very fine and smooth edge: Its office is to follow the *Former*, and to *pare* off, and *smoothen*, the irregularities the *Former* made.

It is not knockt upon with the *Mallet*, but the Blade is clasped upon the out side of the hindermost joints of the fore and little fingers, by the clutched inside of the middle and third fingers of the right hand, and so its edge being set upon the *scribed line*, and the top of the *Helve* placed against the hollow of the inside of the right sholder, with pressing the sholder hard upon the *Helve*, the edge cuts and pares away the irregularities.

This way of handling, may seem a preposterous posture to mannage an Iron Tool in, and yet the reason of the Original contriver of this Posture is to be approved; For, should Workmen hold the *Blade* of the *Paring-Chissel* in their whole hand, they must either hold their hand pretty near the *Helve*, where they cannot well mannage the *Tool*, or they must hold it pretty near the edge, where the outside of the fingers will hide the *scribed line* they are to *Pare* in. But this posture, all Workmen are at first taught, and Practice doth so inure them to it, that if they would, they could not well leave it.

§. 12. Of the Skew-Former.

The *Skew-Former* marked C 4, is seldom used by Joyners, but for cleansing accute Angles, with its accute Angle on its edge, where the *Angles* of other *Chissels* will not so well come.

§ 13.

§ 13. Of the Mortefs-Chiffel.

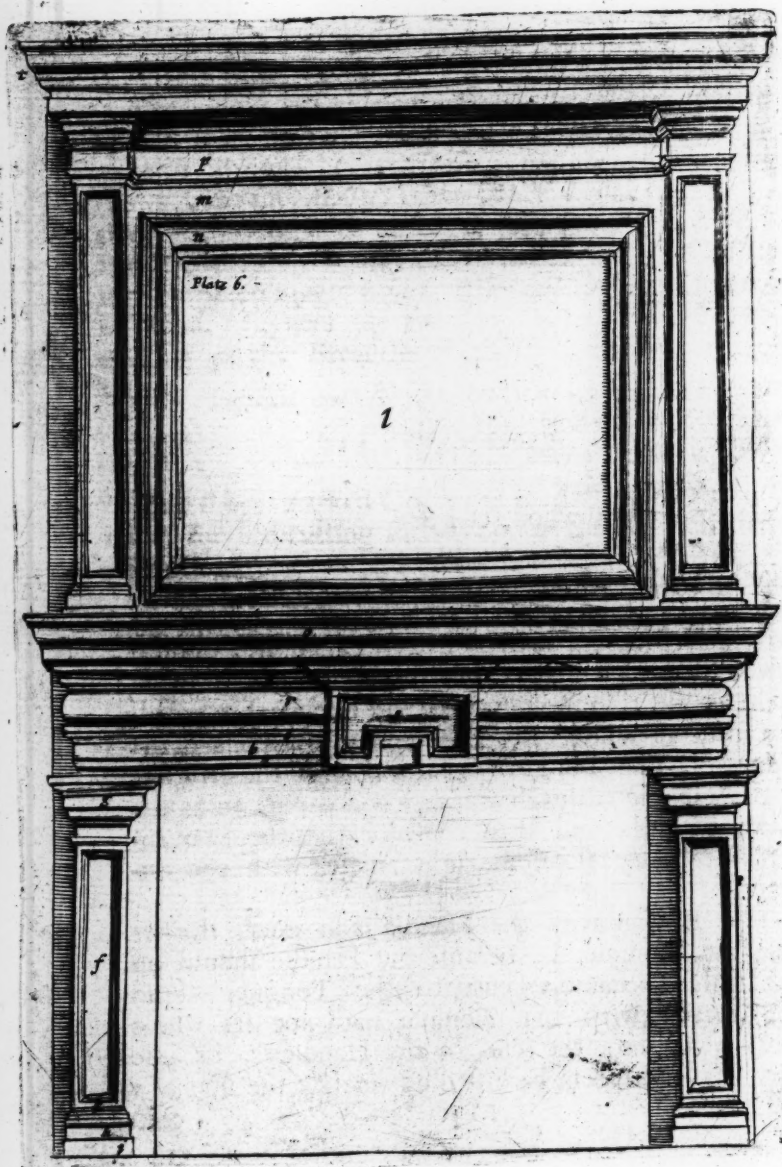
The *Mortefs Chiffel* marked C5. is a narrow *Chiffel*, but hath its *Blade* much thicker, and consequently stronger (that it may endure the heavier blows with the *Mallet*) than other *Chiffels* have, so that in grinding it to an edge, it is ground to a very broad *Bafil*, as you may see in the Figure. Its Office is to cut deep square holes, called *Mortesses*, in a piece of Wood. Joiners use them of several Breadths according as the Breadths of their *Mortesses* may require.

§ 14. Of the Gouge.

The *Gouge* marked C6. is a *Chiffel* having a round edge, for the cutting such Wood as is to be Rounded, or Hollowed.

These several sorts of *Chiffels* Joiners have of several Sizes, that they may be accommodated to do several Sizes of Work.





MECHANICK EXERCISES:

OR,

The Doctrine of *Handy-Works*.

Continued in the ART of JOYNER.

§ 15. *Of the Square, and its Use.*

THE Square, marked D, is two adjunct Sides of a Geometrical Square. *a* The Handle. *b* The Tongue. *c* The Outer Square. *d* The Inner Square. For Joyner's use, it is made of two pieces of wood, the one about an Inch thick, and the other about a quarter of an Inch thick: These two pieces are severally shot exactly straight, and have each of their Sides parallel to each of there own Sides. The thick Piece (called the Handle) hath a Mortise in it, as long within a quarter of an Inch, as the thin piece (called the Tongue) is broad, and stiffly so wide, as to contain the thickness of the Tongue. The Tongue is fastned into the Mortise of the Handle with Glew and wooden pins, so as the two outer sides (and then consequently the two inner sides) may stand at right Angles with one another.

The Reason why the Handle is so much thicker than the Tongue, is, because the Handle should on either side become a Fence to the Tongue. And the reason why the Tongue hath not its whole breadth let into the end of the Handle is, because they may with less care strike a line by the side of a

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thin

athin than a thick piece: For if instead of holding the hand upright when they strike a line, they should hold it never so little inwards, the shank of a Pricker falling against the top edge of the Handle, would throw the Point of a Pricker farther out than a thin piece would: to avoid which Inconvenience, the Tongue is left about half an Inch out of the end of the Handle.

Another Reason is, That if with often striking the Pricker against the Tongue it becomes ragged, or uneven, they can with less trouble plane it again when the stuff is all the way of an equal strength, than they can, if cross-grain'd Sholders be added to any part of it.

Its use is for the striking of Lines square either to other Lines, or to straight sides, and to try the squareness of their Work by; As if they would strike a Line square to a side they have already shot: They apply the inside of the Handle close to the side shot, and lay the Tongue flat upon the work, then by the outside of the Tongue, they draw with a Pricker a straight line: this is called *Striking, or drawing of a Square*. Or, if they would Try the squareness of a Piece of stuff shot on two adjoining sides, they apply the insides of the Handle and Tongue to the outsides of the stuff, and if the outsides of the stuff do all the way agree in Line with the insides of the Square, it is true Square. Or if they would try the inward squareness of work, they apply the two outsides of the Square to the insides of the work.

§ 16. *The manner of Plaining and Trying a piece of Stuff square.*

We will take, for Example, a Piece of Stuff called a Quarter, which is commonly two Inches thick, four Inches broad, and seven Foot long. To plane this Square, lay one of its broad sides upon the Bench, with one of its ends shov'd pretty hard into the Teeth of the Bench-hook, that it may lie the steddier. Then with the Fore-Plane, as you were taught § 2. *Number. 2.* Plane off the roughness the Saw made at the Pit, and work that side of the Quarter, as straight in its length and breadth as you can with the Fore-Plane; which you may give a pretty good guess at, if the edge of the Iron have born all the way upon the work, yet you may try by taking up your work, and applying one end of it to one Eye, whilst you wink with the other, and observe if any Hollow, or Dawks be in the length; if not, you may conclude it pretty true: For the work thus held, the Eye will discern pretty nearly. Or, for more certainty, you may apply the edge of the two-foot Rule, or rather a Rule shor the full length of the Quarter to your work, and if it agree all the way with the Rule, you may conclude it is straight in length. But if you find it not straight, you must still with the Fore-Plane work off those Risings that bear the edge of the Rule off any part of the Stuff: Then try if the Breadth be pretty straight, if it be, (the Dawks the roughness the Fore Plane made excepted) the first office of the Fore Plane is perform'd: If it be not, you must straighten the Breadth as you did the Length.

But though this Quarter be thus plain'd straight in length and breadth, yet because the Iron of the

Fore Plane for its first working the stuff is set Rank, and therefore makes great Dawks in the Stuff, you must set the Iron of your Fore Plane finer, as you were taught § 3. *Number. 2.* and with it then work down even almost to the bottom of those Dawks: then try it again, as before, and if you find it Try all the way, you may, with the Joynter, or Smoothing Plane, but rather with the Joynter, go over it again, to work out the irregularities of the fine Fore-Plane: For the Iron of the Fore-Plane being ground to a Rising in the middle, as has been shewed § 2. *Numb. 2.* though it be very fine set, will yet leave some dawks in the Stuff for the Joynter, or smoothing Plane, to work out. Thus the first side of the Quarter will be finished.

Having thus Tryed one side of the Quarter straight and flat, apply the inside of the Handle to it, and if one of the adjoining sides of the Quarter, comply also with the inside of the Tongue all the way, you need only smooth that adjoining side: But if it do not so comply, that is, if it be not square to the first side, which you will know by the riding of the inside of the Tongue upon one of the edges, or some other part between the edges, you must, with the Fore-Plane Rank-set, plane away that stuff which bears off the inside of the Tongue from complying all the way with it. But if the Risings be great, you may, for quickness, hew away the Risings with the Hatchet: but then you must have a care you let not the edge of your Hatchet cut too deep into the stuff, lest you either spoil your Stuff, by making it unsizeable, if it be already small enough; or if it have substance enough, make your self more labour to get out those Hatchet stroaks with the Plane than you need. Then take off the roughness

roughness the Hatchet made with the Fore-Plane Rank-set, then fine set, and last of all with the Joyn-ter, or smoothing Plane: So is the second side also finished.

To work the third side, set the Oval of the Gage exactly to that width from the Gage, that you intend the Breadth of the Quarter (when wrought) shall have, which, in this our Example, is four Inches, but will be somewhat less, because working it true will diminish the Stuff: Therefore sliding the Oval on the Staff, measure on your Inch Rule so much less than four Inches, as you think your stuff diminishes in working: Measure, I say, between the Oval and the Tooth, your size: If, at the first proffer, your Oval stand too far from the Tooth, hold the Oval in your hand, and knock the Tooth end of your Staff upon the Work-Bench, till it stand near enough: If the Oval stand too near, knock the other end of the Staff upon the Work-Bench till it be fit. Then apply the flat of the Oval to the second wrought side of your Stuff, so as the Tooth may reach athwart the breadth of the Stuff upon the first side, and keeping the Oval close against the second side, press the Tooth so hard down, that by drawing the Gage in this posture all along the length of the Quarter, the Tooth may strike a Line. In like manner upon the side opposite to the first, viz. the Fourth side, Gage another line opposite to the first gaged line, and work your Stuff down to those two Gaged lines on the third side, either with Plaining along, or with Hewing, and afterwards Plaining, as you were taught to work the second side.

To Work the fourth side, set the Tooth of the Gage to its exact distance from the Oval, viz. two Inches wanting

wanting so much as you think the stuff diminish'd in working, and apply the flat of the Oval to each side of the first side, and Gage as before two lines, one on the second, the other on the third wrought side. Work your stuff then down on the fourth side to those two Gage lines, either with Plaining alone, or with Hewing, and afterwards Plaining, as you were taught to work the second side.

§ 17. *To Frame two Quarters Square into one another.*

You must take care in Mortessing and Tennanting, that as near as you can you equallize the strength of the sides of the Mortess to the strength of the Tennant. I do not mean that the stuff should be of an equal Substance, for that is not equallizing strength: But the equallizing strength must be considered with respect to the Quality, Position and Substance of the Stuff: As if you were to make a Tennant upon a piece of Fur, and a Mortess to receive it in a piece of Oak, and the Fur and Oak have both the same size; The Tennant therefore made upon this piece of Fur, must be considerably bigger than a Tennant need be made of Oak, because Fur is much a weaker wood then Oak, and therefore ought to have a greater Substance to equallize the strength of Oak. And for Position, the shorter the stuff that the Tennant is made on, the less Violence the Tennant is subject to. Besides, it is easier to split wood with the grain, than to brake wood cross the grain; and therefore the same wood when posited as a Tennant, is stronger than the same wood of the same size when posited as a Mortess: for the injury a Mortess is subject to is, splitting with the grain of the wood, which, without good care, it will often do

do in working ; but the force that must injure a Tennant, must offend it cross the grain of the wood, in which position it will best indure violence.

When two pieces of Wood, of the same quality and substance (as in this our Example) are elected to make on the one a Tennant, and in the other a Mortefs. If you make the Mortefs too wide, the sides of the Mortefs will be weaker than the Tennant ; or, if too narrow, the Tennant that must fit the Mortefs, will be weaker than the sides that contain the Mortefs : And if one be weaker then the other, the weakest will give way to the strongest, when an equal violence is offer'd to both. Therefore you may see a necessity of equallizing the strength of one to the other, as near as you can. But because no Rule is extant to do it by, nor can (for many considerations, I think,) be made, therefore this equallizing of strength, must be referred to the Judgment of the Operator. Now to the work.

The Mortefs to be made is in a Quarter four Inches broad. In this case Workmen make the Mortefs an Inch wide, so that an Inch and an half Stuff remains on either side it. Therefore your Stuff being squar'd, as was taught in the last Section, set the Oval of the Gage an Inch and an half off the Tooth, and gage with it, on either side your Stuff, a straight line at that distance from the end you intend the Mortefs shall be, then open your Compasses to two Inches, and prick off that distance in one of the lines, for the length of the Mortefs : then lay the inside of the Handle of the Square to one side of the Stuff, and upon both the pricks successively, and with your Pricker draw straight lines through them by the side of the Tongue, so shall the bounds of your Mortefs be struck out on the Quarter. If your Mortefs go through

through the Quarter, draw the same lines on the opposite side of the Quarter, thus, Turn the Quarter, or its edge, and apply the inside of the Handle of the Square, to the ends of the former drawn lines, and by the side of the Tongue draw two lines on the edge of the Quarter; then turn the Quarter again with its other broad side upwards, and apply the inside of the Handle of the Square to the ends of the last lines drawn on the edge, and by the side of the Tongue, draw two lines on this broad side also. These two lines (if your quarter was truly squar'd) shall be exactly opposite to the two lines drawn on the first broad side of the quarter for the length of the Mortefs: And for the width of the Mortefs Gage this side also, as you did the first; then for the Tennant, Gage on that end of the Quarter you intend the Tennant shall be made, the same lines you did for the Mortefs. And because the Quarter is two Inches thick, prick from the end two Inches, and applying the inside of the Handle of the Square to the side of the Quarter, and the Tongue to that Prick, draw by the side of the Tongue a line through that side the Quarter; then turn the other sides of the Quarter successively, and draw lines athwart each side the Quarter, as you were taught to draw the opposite lines for the Mortefs.

Then place the edge of the Inch-Mortefs-Chissel with its Basil from you, and the Helve bearing a little towards you, within one half quarter of an Inch of one end of the struck Mortefs, and with your Mallet knock hard upon it, till you find the Basil of the Chissel will no longer force the chips out of the Mortefs; then remove the Chissel to the other end of the Mortefs, and work, as with the first end, till the Chips will void no longer: Then work away the
the

the Stuff between the two Ends, and begin again at one of the ends, and then at the other, and work deeper into the Mortefs, then again between both; and so work deeper by degrees, till you have wrought the Mortefs through, or (if not through) to the intended depht; then with the Mortefs-Chiffel work nearer the drawn lines at the ends of the Mortefs, (for before you were directed to work but within half a quarter of an Inch of the drawn lines,) by laying light blows on it, till you have made it fit to pare smooth with a narrow Paring Chiffel, and then pare the ends, as you were taught to work with the Paring-Chiffel: then with the broad Paring-Chiffel, pare the sides of the Mortefs juft to the Struck lines; fo is the Mortefs finished.

To work the Tennant, lay the other Quarter on edge upon your Work-Bench, and fasten it with the *Holdfast*, as you were taught Sect. I. Then with the Tennant, Saw a little without the Struck-line towards the end: you must not Saw juft upon the Struck-line, becaufe the Saw cuts rough: Besides, you must leave some Stuff to pare away smooth to the Struck-line, that the *Stile* (that is, the upright Quarter) may make a close Joint with the *Rail* (that is) the lower Quarter: Saw therefore right down with the Tennant-Saw, juft almost to the gaged lines for the thickness of the Tennant, and have a care to keep the Blade of the Saw exactly upright. Then turn the opposite side of the Quarter upwards, and work as you were taught to work the first side.

Then with the Paring-Chiffel, pare the Work close to the gaged lines for the Tennant. Then try how it fits the Mortefs: If it be not pared enough

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away

away, you must Pare it where it Bears, that is, sticks. But if you should chance to have made it too little, you have spoiled your work : Therefore you may see how necessary it is, not to make the Mortefs too wide at first, or the Tennant too narrow.

Then with the Piercer pierce two holes through the sides, or cheeks of the Mortefs, about half an Inch off either end one. Then knock the Tennant stiff into the Mortefs, and set it upright, by applying the Angle of the outer Square, to the Angle the two Quarters make, and with your Pricker, prick round about the insides of the Pierced holes upon the Tennant. Then take the Tennant out again, and Pierce two holes with the same Bit, about the thickness of a shilling above the Pricked holes on the Tennant, that is, nearer the sholder of the Tennant, that the Pins you are to drive in, may draw the sholder of the Tennant the clofer to the flat side of the Quarter the Mortefs is made in. Then with the Paring-Chissel make two Pins somewhat Tapering, full big enough, and setting the two Quarters again square, as before, Drive the Pins stiff into the Pierced holes.

If you make another Square, as you did this; and make also a Tennant on each un-Tennanted end of the Stiles, and another Mortefs on the top and bottom Rails, you may put them together, and make square Frame of them.

§ 18. *Of the Miter Square. And its Use.*

The Miter square marked E, hath (as the Square) an Handle marked *a*, one Inch thick, and three Inches broad, and a Tongue marked *b*, of about the same breadth: the Handle and the Tongue (as the Square) have

have both their sides parallel to their own sides. The Handle (as the square) hath in the middle of its narrowest Side a Mortise in it, of an equal depth, the whole length of the Handle: Into this Mortise is fitted one end of the Tongue, but the end of the Handle is first Bore'd off to make an Angle of 45 Degrees with its inside. This Tongue is (as the square) Pin'd and Glued into the Mortise of the Handle.

It is used for striking a Miter-line, as the Square is to strike a Square-line, by applying the Inside of the Handle to the outside of the Quarter, or Batten, you are to work upon; and then by striking a line by the side of the Tongue: For that line shall be a Miter line. And if upon two Battens you strike two such lines, and Saw and Pare them just off in the lines, when the flats of those two sawn ends are applied to one another, the out and inside of the Battens, will form themselves into the Figure of a Square.

Thus Picture Frames, and looking Glass-frames, are commonly made, as by a more full Example you may see in the next Section.

§ 19. Of the Bevil.

As the Square is made to strike an Angle of 90 Degrees, and the Miter an Angle of 45 degrees, so the Bevil (marked F) having its Tongue movable upon a Center, may be set to strike Angles of any greater, or lesser, numbers of Degrees, according as you open the Tongue wider from, or shut it closer to the Handle. It is used as the Square, and the Miter, and will perform the Offices of them both, though it be not purposely made for either; but for the striking such Bevil lines, as one part of your work must be cut

away to, to make it join with another part of your work:
For Example,

We will propose to make a Frame for a Picture, Looking-Glass, &c. containing eight straight Sides ; You may quickly perceive that all the ends of these eight sides must be cut to Bevils, and what Bevils they must be, you will, find if you describe upon a smooth flat Board, a Circle of any bigness, but the larger the better: Divide this Circle into eight equal parts, and from every point draw a Line to the Center: Draw also straight lines from every point to its next point: Then lay the inside of the Handle of your Bevil exactly upon any one of these straight lines, so as the Angle made by the inside of the Handle, and the inside of the Tongue, lie exactly at the very Angle made by this straight line, and the Semi-Diametral line proceeding from the Center, and move the Tongue nearer, or farther off the Handle, till the inside of the Tongue and the inside of the Handle, lie exactly upon those two lines, so shall your Bevil be set.

Then having fitted your Pieces to your Scantling, Stick your Pricker as near the outward Corner of your Pieces as your stuff will bear, and apply the inside of your handle also to the outer sides of your Pieces, and so as the inside of the Tongue may be drawn home to the Pricker. For then lines drawn on those Pieces by the inside of the Tongue, shall be the lines the Pieces must be cut in, to make these eight Pieces join evenly together by the sides of each other's Bevil: Then with the Strike-block smooth the ends of the Bevils, as you were taught in the Section of the Strike-Block.

If you have a Board on the Back-side of this Frame, you may Glew the backsides of these Pieces,
piece

piece by piece to the Board; but first you must fit them to an exact compliance of every Bevil with its Match, and when they are so fitted, drive two Nails close to the outside of every piece, but drive not the Nails deep into the Board, because when the Frame is set, and Glewed, or otherwise fastened, you must draw the Nails out again, For these Nails are only intended to serve for Fences to set, and fit each piece into its proper place, before the whole Frame is fastned together. And should you not thus Fence them, though by your Eye you might judge you fitted the Bevils exactly, yet one piece being never so little out of its due position, would drive the next piece more out, and that the next, till at the last, the last piece would not join, but either be too short, or too long, or stand too much out, or in, or else too open, or too close on the out, or inside.

But if you have no Board on the backside, you must, when you Saw the Bevilling Angles upon the square ends of pieces, not sawn quite through the depth of one end of every piece, but about half way through the depth, or thickness, and then with your Chissel either split, or else pare, the upper side of the square end flat away to the Bevil, and so leave part of of the square end of your piece, to lap under the piece is joined to. For Example,

In Fig. 3. Plate 5. $a b$ is the square end of the piece, and $b c$ is the Bevil you work the piece to. Therefore you must work away so much of the thickness of the square end, as is comprehended between a and c , so that you will see the Triangle $a b c$, is to be wrought away half way down the thickness of the Stuff, and so will the Triangle $a b c$ be left for the other half thickness of the Stuff. But that end of the
piece

piece mark'd 1, which joins to the piece mark'd 2, must, upon its Bevil-stroak, be sawn quite off, and its underside must have the same Triangle wrought into it, just so fit as to receive the Triangle in piece 2, and just so deep, as that when the Triangle on piece 2, is fitted into the Triangle in piece 1, the Superficies of both the pieces may be even with one another. And thus you may lap the ends of every piece into one another.

These Triangles at the ends of the pieces you may Glew into one another, but if you think Glewing alone not strong enough, you may Pierce an hole near the inner edge of the Frame, because the Triangle hath there most substance of stuff; and afterwards Pin it, as you are taught to Pin the Rail and Stile together in Sect. 17.

This way of Lapping over, is sometimes used also for square Miters, or other Angular Frames.

§. 20. *Of the Miter-Box.*

There is another way used by Joyners that make many Frames, to save themselves the labour of Drawing, or striking out of Squares, Miters, and several Bevils upon their Stuff: And this is with a Tool called a *Miter-Box*, described in Plate 5. Fig. 2. It is composed of two pieces of Wood, of an Inch thick each, as A the upright piece, B the Bottom piece. The Upright piece is nailed upright, fast upon the Bottom-Piece. And this Upright-piece hath on its upper side the Miter Lines struck with the Miter square, as *d e*, on the left hand, and *g h* on the right hand: on these two Miter lines the edge of the Saw is set, and a kerf made straight down the upright piece, as from *d e* on the left hand to *f*, and from *g h* on the right hand to *i*. In like manner

ner any other Bevil is struck upon the upper side of the upright piece with the Bevil, as *k l* on the left hand, and *n o* on the right. On these two Bevil lines the edge of the Saw is set, and a kerf made straight down the upright piece, as from *k* to *l m*, and from *g h* to *i*. You may make as many Bevils as you please on the upright piece, of the Miter Box; Bevils to join Frames of either five, six, seven, eight sides, &c. and the manner to make them to any number of sides, was in part taught in the last Section. For as there you were directed to divide the Circle into eight equal parts, because eight was the number of sides, we proposed to make that Frame consist of; So, if for any number of sides you divide the Circle into the same equal parts, and work as you were there directed, you may find what Bevil the Pieces must have that make a Frame that consists of any number of sides.

So also for Sawing of any Batten, or other small pieces square: Strike at the point *a*, on the upper side of the upright piece a line straight athwart it, to *b*, and Saw straight down the upper piece, to *c*.

The manner how these Kerfs are sawn straight down with greatest certainty is, thus, Apply the inside of the Handle of the square to the upper side of the upright piece, so as the Tongue lie close to that end of the Miter, Bevil, or square line struck through the upper side of the Miter-Box, and with the Pricker strike a line close by the side of the Tongue, through that side of the upright piece; Turn the Tongue to the other side of the upright piece, and apply the inside of the Handle of the square to the other end of the Miter, Bevil, or Square line, and with the Pricker strike also a line close by the side of the Tongue through that side the upright

upright piece. These two lines struck on either side of the upright piece, shall be a line on each side in which the edge of the Saw must run, to saw it straight down.

§ 21. Of the Gage.

The Gage mark'd G. (in Plate 4) The Oval *b* is fitted stiff upon the Staff *c*, that it may be set nearer or farther from the Tooth *a*. Its Office is to Gage a line parallel to any straight side. It is used for Gaging Tennants, and for Gaging Stuff to an equal thickness.

When you use it, you must set the Oval to the intended Distance from the Tooth: If the Oval stand too near the Tooth, Hold the Oval in your right hand, and knock the hinder end of the Staff upon the Work-bench, till it remove to its just distance from the Tooth: If it stand too far off the Tooth, knock the fore end of the Staff (*viz.* the Tooth end) till it remove to its just distance from the Tooth: If the Oval slide not stiff enough upon the Staff, you may stiffen it by striking a wooden wedge between the Mortise and the Staff: So may you apply the side of the Oval next the Tooth, to the side of any Table, or any other straight side, with the Tooth Gage a line parallel (or of equal distance) all the way from that side.

§ 22. Of the Piercer.

The Piercer H, in Plate 4. hath *a* the Head, *b* the Pad, *c* the Stock, *d* the Bitt. Its office is so well known, that I need say little to it. Only, you must take care to keep the Bitt straight to the Hole you pierce, lest you deform the Hole, or break the Bitt.

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You ought to be provided with Bitts of several sizes, fitted into so many Padds.

§ 23. *Of the Gimblet.*

The *Gimblet* is marked I, in *Plate 4*. It hath a Worm at the end of its Bit, Its Office is to make a round hole in those places of your work where the *stock* of the Piercer by reason of its own sholder, or a sholder, or Butting out upon the work will not turn about. Its Handle is held in a clutched hand, and its Bit twisted stiff into your work. You must have them of several sizes.

§ 24. *Of the Augre.*

The *Augre* marked K in *Plate 4*. hath a the Handle, *b* the Bit. Its Office is to make great round holes. When you use it, the stuff you work upon is commonly laid low under you, that you may the easier use your strength upon it: For in twisting the Bit about by the force of both your hands, on each end of the Handle one, it cuts great chips out of the stuff. You must bear your strength perpendicularly straight to the end of the Bitt; as with the Piercer.

§ 25. *Of the Hatchet.*

The *Hatchet* is marked L, in *Plate 4*. Its use is so well known (even to the most un-intelligent) that I need not use many words on it, yet thus much I will say, Its use is to Hew the irregularities off such pieces of stuff which may be sooner Hewn than Sawn.

When the Edge is downwards, and the Handle towards you, the right side of its Edge must be Ground to a Bevil, so as to make an Angle of about 12 Degrees with the left side of it: and afterwards set with the Whetstone, as the Irons of Planes, &c.

§ 26. *The Use of the Saw in general.*

In my former *Exercises*, I did not teach you how to chuse the Tools a Smith was to use; Because it is a Smith's office to make them: And because in those *Exercises* I treated of making Iron work, and Steel work in general, and the making and excellency of some Tools in particular, which might serve as a general Notion for the knowledge of all Smith's Workmanship, especially to those that should concern themselves with Smithing: But to those that shall concern themselves with Joinery, and not with Smithing; It will be necessary that I teach them how to chuse their Tools that are made by Smiths, that they may use them with more ease and delight, and make both quicker and neater work with them.

All sorts of Saws, for Joyner's use, are to be sold in most Iron-monger's shops, but especially in *Foster-lane, London*: chuse those that are made of Steel, (for some are made of Iron) for Steel of it self is harder and stronger than Iron: You may know the Steel-Saws from Iron-Saws thus, The Steel-Saws are generally ground bright and smooth, and are (the thickness of the Blade considered) stronger than Iron Saws: But the Iron-Saws are only Hammer-hardried, and therefore if they could be so hard, yet they cannot be so smooth, as if the irregularities of the Hammer were well taken off with the Grindstone: See it be free from flaws, and very well Hammered, and smoothly

Smoothly Ground, (that is, evenly Ground,) you may know if it be well Hammered by the stiff bending of it, and if it be well Ground, (that is, evenly Ground,) it will not bend in one part of it more than in another ; for if it do, it is a sign that part where it bends most is, either too much Ground a-way, or too thin Forged in that place : But if it bend into a regular bow all the way, and be stiff, the Blade is good : It cannot be too stiff, because they are but Hammer-hardned, and therefore often bow when they fall under unskilful hands, but never break, unless they have been often bowed in that place. The edge whereon the Teeth are, is always made thicker than the back, because the back follows the Edge, and if the Edge should not make a pretty wide Kerf, if the back do not strike in the Kerf, yet by never so little irregular bearing, or twisting of the hand awry, it might so stop, as to bow the *Saw* ; and (as I said before) with often bowing it will break at last. When Workmen light of a good Blade thus qualified, they matter not much whether the Teeth be sharp or deep, or set to their mind : for to make them so, is a Task they take to themselves : And thus they perform it : They wedge the blade of the *Saw* hard into the *Whetting-Block*, marked P. in *Plate 4.* with the handle towards their left hand, and the end of the *Saw* to the right, then with a three-square File they begin at the left hand end, leaning harder upon the side of the file on the right hand, than on that side to the left hand ; so that they file the upperside of the Tooth of the *Saw* a-slope towards the right hand, and the underside of the Tooth a little a-slope towards the left, or, almost down-right. Having filed one Tooth thus, all the rest must be so filed. Then with the *Saw-wrest*, marked O. in *Plate 4.*

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they *set* the Teeth of the Saw: that is, they put one of the Notches marked *a a a* of the *Wrest* between the first two Teeth on the Blade of the *Saw*, and then turn the Handle Horizontally a little about upon the Notch towards the end of the *Saw*; and that at once turns the first Tooth somewhat towards you, and the second Tooth from you: Then skipping two Tooth, they again put one of the notches of the *Wrest* between the third and fourth Teeth on the Blade of the *Saw*, and then (as before) turn the Handle a little about upon the notch towards the end of the *Saw*, and that turns the third Tooth somewhat towards you, and the Fourth somewhat from you: Thus you must skip two Teeth at a time, and turn the *Wrest* till all the Teeth of the *Saw* are *set*. This *Setting* of the Teeth of the *Saw* (as Workmen call it) is to make the Kerf wide enough for the Back to follow the edge: and is Set *Ranker* for soft, coarse, cheap Stuff, than for hard, fine, and costly Stuff: for the *Ranker* the Tooth is *set*, the more Stuff is wasted in the Kerf: and besides, if the Stuff be hard it will require greater labour to tear away a great deal of hard Stuff, than it will do to tear away but a little of the same Stuff

The *Pit-Saw*, is Set so Rank for coarse stuff, as to make a Kerf of almost a quarter of an Inch, but for fine and costly stuff they *set* it finer to save Stuff. The *Whip-Saw* is *set* somewhat finer than the *Pit-Saw*; the *Hand-Saw*, and the *Compass-Saw*, finer than the *Whip-Saw*; But the *Tennant-Saw*, *Frame-saw*, and the *Bow-Saw*, &c. are *set* fine, and have their Teeth but very little turned over the sides of their Blades: So that a Kerf made by them, is seldom above half a half quarter of an Inch.

The reason why the Teeth are filed to an Angle, pointing

pointing towards the end of the *Saw*, and not towards the handle of the *Saw*, or directly straight between the handle and end of the *Saw*, is, Because the *Saw* is designed to cut only in its progress forwards; Man having in that activity more strength to rid, and Command of his hands to guide his Work, than he can have in drawing back his *Saw*, and therefore when he draws back his *Saw*, the Work-men bears it lightly off the unsawn *Stuff*; which is an ease to his labour, and enables him the longer to continue his several Progressions of the *Saw*.

Master-Workmen, when they direct any of their Underlins to saw such a piece of *Stuff*, have several Phrases for the sawing of it: They seldom say *Saw that piece of Stuff*; But *Draw the Saw through it*; *Give that piece of Stuff a kerf*; *Lay a kerf in that piece of Stuff*; and sometimes, (but most improperly,) *Cut*, or *Slit that piece of Stuff*: For the *Saw* cannot properly be said to cut, or slit the *Stuff*; but it rather breaks, or tears away such parts of the *Stuff* from the whole, as the points of the Teeth prick into, and these parts it so tears away are proportionable to the fineness, or rankness of the Setting of the Teeth.

The Excellency of Sawing is, to keep the kerf exactly in the line marked out to be Sawn, without wriggling on either, or both sides; And straight through the *Stuff*, as Work-men call it; that is, in a Geometrical Term, perpendicularly through the upper and underside, if your Work require it, as most work does: But if your work be to be Sawn upon a Bevil, as some work sometimes is, then you are to observe that Bevil all the length of the *Stuff*, &c.

§ 27. *The Use of the Pit-Saw, marked M. in Plate 4.*

The *Pit-Saw* is not only used by those Work-men that make Sawing Timber and Boards their whole business, but is also for small matters used by Joiners, when what they have to do, may perhaps be as soon done at home, as they can carry or send it to the Sawyers. The manner of their working is both alike, for if it be a Board they would flit off a piece of Timber, or if they would take any square, Quarter, or Batten, &c. off, they first set off their Scantlin: For Example, If it be an Inch (or more, or less) they would take off a piece of Stuff, they open the points of their Compasses to an Inch measure on their Rule, and so much more as they reckon the kerf of the *Saw* will make, and from on side of their Stuff they set off at either end of the Stuff, the Distance of the points of their Compasses; at this Distance therefore they make with the points of their Compasses a prick at either end of the Stuff; Then with Chaulk they whiten a line, by rubbing the Chaulk pretty hard upon it; Then one holds the line at one end upon the prick made there, and the other strains the line pretty stiff upon the prick at the other end; then whilst the line is thus strain'd, one of them between his Finger and Thumb draws the middle of the line directly upright, to a convenient height (that it may spring hard enough down) and then lets it go again, so that it swiftly applies to its first position, and strikes so strongly against the Stuff, that the dust, or atoms of the Chaulk that were rubbed into the Line, shake out of it, and remain upon the Stuff. And thus also they mark the under-side of their Stuff: This is called *Lining of the Stuff*: And the
Stuff

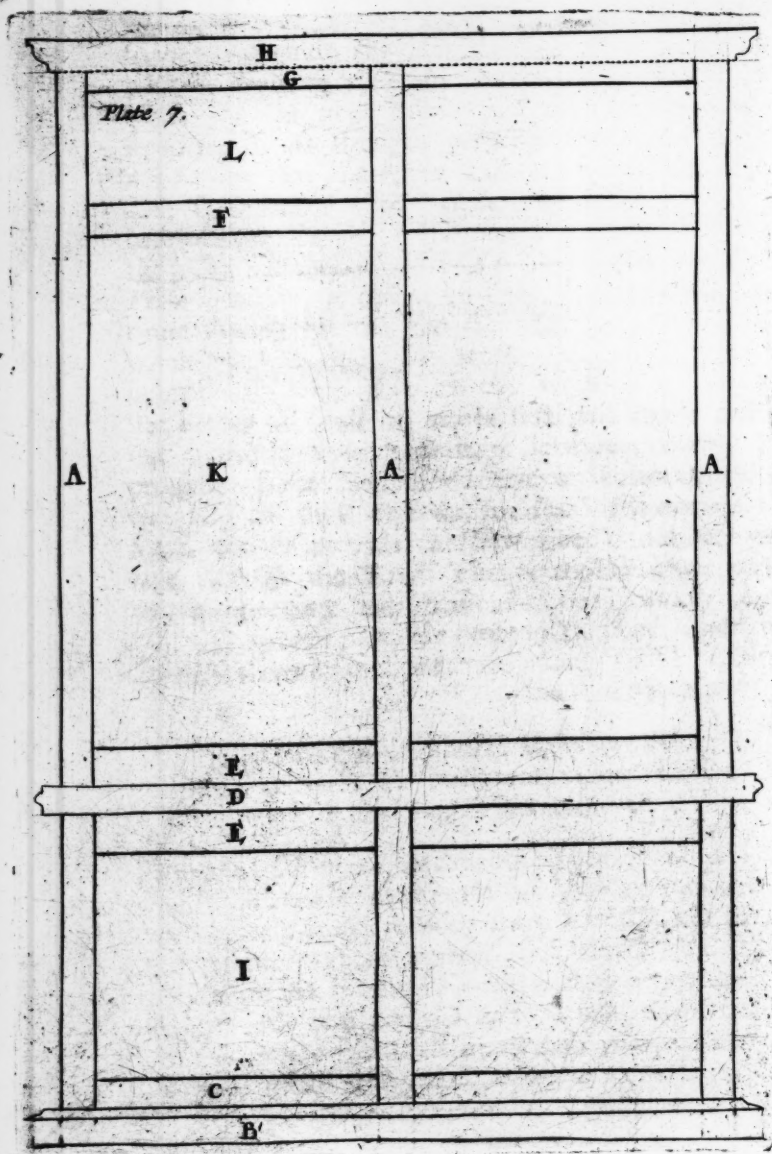
Stuff cut into those lines shall be called *Inch-Stuff*, because the Compasses that prick the Stuff, were opened wider by the width of the kerf than an Inch measure upon the Rule: But had the Compasses been opened but an Inch exactly, that piece Sawed off should, in Workmen's Language, have been called *Inch-prickt*, thereby giving to understand that it is half the breadth of the kerf thinner than an Inch: And thus they call all other Scantlins 2 *Inches*, 2 $\frac{1}{2}$ *Inches*, 3 *Inches*, &c. *Sawn*, or *Prickt*.

When two Work-men are not at hand to hold the line at both ends, he that lines it, strikes one point of his Compass, or sometimes a Pricker, or a Nale aslope towards that end into the prick set off, and putting the noose at the end of his line over his Compasses, &c. goes to the other end, and strains his line on that prick, and strikes it as before.

The Stuff being thus lined is fastned with wedges over the *Pit*, (if the Joyner be accommodated with a *Pit*) if he have none, he makes shift with two high frames a little more than Man high in its stead, (called *great Trussels*) with four Legs, these Legs stand spreading outwards, that they may stand the firmer: Over these two *Trussels* the Stuff is laid, and firmly fastned that it shake not. Its outer side from whence the Pricks were set off must be Perpendicular, which you must try by a Plumb-line, for should the top edge of that side, hang never so little over the bottom edge, or the bottom edge not lie so far out as the top edge, the Scantlin you Sawed off would not be of an equal thickness on the Top or Bottom: Because the Saw is to work exactly perpendicular. Then with the *Pit-Saw* they enter the one end of the Stuff, the *Top-man* at the Top, and the *Pit-man* under him: the *Top-man* observing,

serving to guide the *Saw* exactly in the line: and withall drawing the *Saw* somewhat towards him when the *Saw* goes down; and the *Pit-man* drawing it with all his strength perpendicularly down; but not so low that the upper and lower handles of the *Saw* sink below both their managements: Then bearing the Teeth of the *Saw* a little off the Stuff, the *Top-man* draws the *Saw* up again, and the *Pit-man* assists, or eases him in it, and thus they continue sawing on till the *Saw* has run through the whole length upon the Stuff. But when the kerf is made so long, that by the working of the *Saw* the Pieces of Stuff on either side will shake against one another, and so more, or less, hinder the easie progress of the *Saw*, they drive a Wedge so far in the kerf as they dare do for fear of splitting the Stuff, and so provide the *Saw* freer and easier passage through the Stuff: This Wedging they continue so oft as they find occasion.





MECHANICK EXERCISES:

O R,

The Doctrine of *Handy-Works*.

Continued in the ART of JOYNER.

§ 28. *The Use of the Whip-Saw, marked N in Plate 4.*

THE *Whip-Saw* is used by Joiners, to Saw such greater pieces of Stuff that the *Hand-Saw* will not easily reach through; when they use it, the Stuff is laid upon the *Trussel*, marked O in *Plate 5.* in the Angles of it. Then two Men takes each an handle of the *Saw*; He to whom the Teeth of the *Saw* points, drawing to him, and the other thrusting from him: And (as before) the *Saw* having run its length, is lifted gently over the Stuff to recover another stroak of the *Saw*.

§ 29. *The use of the Hand-Saw marked D, the Frame or Bow Saw, the Tennant-Saw, marked O in Plate 4.*

These *Saws* are accomodated for a single Man's use, and cut forward as the other *Saws* do. The office of the Cheeks made to the *Frame-Saw* is, by the twisted Cord and Tongue in the middle, to draw the upper ends of the Cheeks closer together, that the lower end of the Cheeks may be drawn the wider asunder, and strain the Blade of the *Saw* the straighter. The *Tennant-Saw*, being thin, hath a Back to keep it from bending.

P

§ 30. *The*

§ 30. *The Use of the Compass-Saw, marked Q Plate 4.*

The *Compass-Saw* should not have its *Teeth Set*, as other *Saws* have; but the edge of it should be made so broad, and the back so thin, that it may easily follow the broad edge, without having its *Teeth Set*; for if the *Teeth* be *Set*, the blade must be thin, or else the *Teeth* will not bow over the Blade, and if it be thin, (considering the Blade is so narrow) it will not be strong enough to abide rough work, but at never so little an irregular thrust, will bow, and, at last, break; yet for cheapness, they are many times made so thin that the *Teeth* require a setting. Its office is to cut a round, or any other *Compass* kerf; and therefore the edge must be made broad, and the back thin, that the Back may have a wide kerf to turn in.

§ 31. *Of the Rule marked D in Plate 5.*

The use of the *Rule* is to measure Feet, Inches, and parts of Inches, which, for that Purpose, are marked upon the flat and smooth sides of the *Rule*, and numbred with Inches, and hath every Inch divided into two halves, and every half into two quarters, and every quarter into two half-quarters; so that every Inch is divided into eight equal parts; And these Inches are numbred from one end of the *Rule* to the other; which commonly is in all 24 Inches: which is a Two-Foot *Rule*.

They have commonly both Board and Timber measure, &c. marked upon them, for the finding both the superficial and solid Content of Board or Timber: The use of which Lines and Tables having

ving been often taught by others, and being more Mathematical than Mechanical, is unproper for me to meddle with in this Place: but rather to refer to those Books.

But the manual use of it is, either to measure length with it, or to draw a straight line by the side of it, or to Try the straightness, or flatness, of their Work with. They Try their work by applying one of its edges to the flat of the wrought side of their Work, and bring their Eye as close as they can, to see if they can see light between the edge of the *Rule* and their Work: If they cannot, they conclude their work is *Try*, and well wrought.

§ 32. *Of the Compasses marked E in Plate 5.*

aa The *Joynt*, *bb* the *Cheeks* of the *Joynt*, *cc* the *Shanks*, *dd* the *Points*. Their Office is to describe Circles, and set off Distances from their Rule, or any other measure, to their Work.

§ 33. *Of the Glew-pot marked F in Plate 5.*

The *Glew-pot* is commonly made of good thick Lead, that by its substance it may retain a heat the longer, that the *Glew Chill* not (as Work-men say when it cools) when it is to be used.

§ 34. *Of Chusing and Boiling Glew.*

The clearest, driest, and most transparent Glew is the best: when you boil it, break it with your Hammer into small pieces, and put it into a clean Skillet, or Pipkin, by no means greasie; for that will spoil the clamminess of the Glew, put to it so

much Water as is convenient to dissolve the Grew, and to make it, when it is hot, about the thickness of the White of an Egg: the quantity of water cannot be assigned, because of the different quality there is in Grew: keep it stirring whilst it is melting, and let it not stick to the sides or bottom of the Vessel: When it is well boiled, pour it into your Grew-pot to use, but let your Grew-pot be very clean. When it is cold, and you would heat it again in your Grew-pot, you must take great care that it burn not to the sides or bottom of the Grew-pot, for that burning either turns to a thick hard skin, or else to a burnt Cinder-like Substance, which if it mingle with the Grew, will spoil it all; because by its Substance it will bear the two Joints you are to Grew together, off each other.

When (with often heating) the Grew grows too thick, you may put more water to it; but then you must make it very hot, lest the Grew and Water do not wholly incorporate.

Some Joiners will (when their Grew is too thick) put Small Beer into it, thinking it strengthens it: I have tried it, and could never find it so, but think it rather makes the Grew weaker, especially if the Small Beer chance to be new, and its Yest not well settled from it, or so stale, that it be either Dreggy, or any whit mingled with the Settling of the Cask.

§ 35. *Of Using the Grew.*

Your Grew must be very warm, for then it is thinnest, and as it chills, it thickens: with a small Brush you must smear the Grew well upon the Joint of each piece you are to Grew together; And before you set them as they are to stand, you must jostle them
one

one upon the other, that the Glew may very well touch and take hold of the Wood ; and that the Glew on each Joints may well incorporate. Then fit the two Joints as they must stand ; And when you set them by to dry, let the one stand upright upon the other ; For if they stand a-slope, the weight of the Stuff when it leans upon two extream edges, may make one end of the Joint *Open*.

§ 36. *Of the Waving Engine.*

The *Waving Engine* discribed in *Plate 5. Fig. 7.* Hath AB a long square Plank, of about seven Inches broad, five Foot long, and an Inch and half thick : All along the length of this Plank, on the middle between the two sides, runs a *Rabbet*, as part of it is seen at C : upon this *Rabbet* rides a *Block*, with a *Groove* in its under side : This *Block* is about three Inches square, and ten Inches long, having near the hinder end of it a wooden Handle going through it, of about one Inch Diameter, as DE : At the Fore-end of this *Block* is fastned a Vice, somewhat larger than a great Hand-Vice, as at F : The *Groove* in the *Block* is made fit to receive the *Rabbet* on the Plank.

At the farther end of the Plank is erected a square strong piece of wood, about six Inches high, and five Inches square, as G. This Square Piece hath a square wide Mortess in it on the Top, as at H. Upon the top of this square piece is a strong square flat Iron Coller, somewhat loosely fitted on, having two Male Screws fitted into two Female Screws, to screw against that part of the Wooden Piece un-mortessed at the Top, marked L, that it may draw the Iron Coller hard against the Iron
marked

marked Q, and keep it stiff against the fore-side of the un-mortised Piece, marked L, when the piece Q, is set to its convenient height; and on the other side the square wooden Piece is fitted another Iron screw, having to the end of its shank fastned a round Iron Plate which lies within the hollow of this wooden piece, and therefore cannot in Draft be seen in its proper place; But I have described it a part, as at M. (Fig. 9.) Its Nut is placed at M, on the wooden Piece. On the farther side of the wooden Piece is fitted a Wooden Screw called a *Knob*, as at N. Through the farther and hither side of the square Wooden Piece is fitted a flat Piece of Iron, about three quarters of an Inch Broad, and one quarter of an Inch thick, standing on edge upon the Plank; but its upper edge is filed round: (the reason you will find by and by:) Its hither end comes through the wooden Piece, as at O, and its farther end on the opposite side of the wooden piece.

Upright in the hollow square of the wooden piece stands an *Iron*, as at Q, whose lower end is cut into the form of the Molding you intend your work shall have.

In the fore side of this wooden Piece is a square hole, as at R, called the *Mouth*,

To this Engine belongs a thin flat piece of hard Wood, about an Inch and a quarter broad, and as long as the Rabbet: It is disjunct from the Engine, and in Fig. 8. is marked S S, called the *Rack*: It hath its under flat cut into those fashioned waves you intend your work shall have: The hollow of these waves are made to comply with the round edge of flat Plate of Iron marken O (described before) for when one end of the Riglet you wave, is, with the Vice, Screwed to the plain side of the
the

the Rack, and the other end put through the Mouth of the wooden Piece, as at T T, so as the hollow of the wave on the under-side of the Rack may lie upon the round edge of the flat Iron Plate set on edge, as at O, and the Iron Q, is strong fitted down upon the Riglet: Then if you lay hold of the Handles of the Block D E, and strongly draw by them, the Rack and the Riglet will both together slide through the Mouth of the wooden Piece: And as the Rounds of the Rack ride over the round edge of the flat Iron, the Rack and Riglet will mount up to the Iron Q, and as the Rounds of the Waves on the under side of the Rack slides off the Iron on edge, the Rack and Riglet will sink, and so in a progression (or more) the Riglet will on its upper side receive the form of the several waves on the under side of the Rack, and also the form, or Molding, that is on the edge of the bottom of the Iron, and so at once the Riglet will be both molded and waved.

But before you draw the Rack through the Engine, you must consider the office of the Knob N, and the office of the Iron Screw M; For by them the Rack is screwed evenly under the Iron Q. And you must be careful that the Groove of the Block slip not off the Rabbet on the Plank: For by these Screws, and the Rabbet and Groove, your work will be evenly gaged all the way (as I said before) under the edge of the Iron Q, and keep it from sliding either to the right, or left hand, as you draw it through the Engine.

§ 37. Of Wainscoting Rooms..

A A A (in Plate 7.) The Stiles. B The Base, C The Lower Rail. D The Sur-Base. E E The Middle Rail, or Rails. F The Frieze-Rail. G The Upper-Rail. H The

H The *Cornice*. I The *Lying Pannel*. K The *Large Pannel*. L The *Frieze Pannel*.

In Wainscoting of Rooms there is, for the most part, but two heights of Pannels used; unless the Room to be Wainscoted be above ten foot high, as some are eleven or twelve Foot high, and then three Heights of Pannels are used: As I The *Lying Pannel*, above the *Base*. K The *Large Pannel* above the *Middle Rail*: And L The *Frieze Pannel* above the *Frieze Rail*.

The *Frieze Rail* is to have the same breadth the *Margent* of the *Stile* hath; The *Middle Rail* hath commonly two breadths of the *Margent* of the *Stile*, viz. one breadth above the *Sur-base*, and the other below the *Sur-base*. And the *Upper* and *Lower Rails* have also each the same breadth with the *Margent* of the *Stile*.

Those Moldings above the Prickt-line on the Top, as H, are called the *Cornice*.

Sometimes (and especially in Low Rooms) there is no *Base* or *Sur-base* used, and then the *Middle* and *Lower Rail* need not be so broad: For the *Middle Rail* need not be above a third part more than the *Margent* of the *Rail*: and the *Lower-Rail* you may make of what breadth you see convenient: They are commonly about three Inches and an half, or four Inches broad, yet this is no Rule: For sometimes Workmen make only a flat Plinth serve.

You may (if you will) adorn the outer edges of the *Stiles* and *Rails* with a small *Molding*: And you may (if you will) Bevil away the outer edges of the *Pannels*, and leave a Table in the middle of the Pannel.

An Explanation of Terms used among Joiners.

When I first began to Print these Exercises, I marked some Terms in *Joinery* with *superiour Letters* (as Printers call them) thus ^{a b c} &c. intending, at the latter end of these Exercises, to have explained the Terms those Letters referr'd to: But upon consideration that those Terms might often be used in this Discourse, when the Superiour Letter was out of sight, and perhaps its position (where) forgotten; I have changed my mind, and left out the Superiour Letters beyond fol. 66. and instead of those References give you this Alphabetical Table of Terms, by which you may always more readily find the Explanation, though you often meet with the Term.

A.

Architrave. See Plate 6. *l.* is the *Architrave Molding*.
Augre § 24. Plat 4. fig. K.

B.

Base. See Plate 6. *h.* And Plate 7. B.

Bead. See Plate 6. *a.*

Bed-molding. See Plate 6. *d.*

Basil. The Basil is an angle the edge of a Tool is ground away to. See fol. 71.

Batten. Is a Scantling of stuff either two, three or four Inches Broad: and is seldom above an Inch thick: and the length unlimitted.

Beak. The end of the Hold-fast. See fol. 60, 61.

Bench-Screw. See Plate 4. A g. and fol. 60.

Bevil. Any sloping Angle that is not a square, is called a Bevil. See fol. 60 85. § 19. and Plate 4. F.

Bitt. See § 22.

Bow-saw. Plate 4. O.

Q

C

C

Capital. See Plate 6. g.

Cast. Stuff is said to Cast, or warp, when by its own droughth or moisture, or the droughth or moisture of the Air, or other accident, it alters its flatness and straightness.

Clamp. When a Piece of Board is fitted with the Grain to the end of another piece of Board cross the Grain the first Board is *Clamp't*. Thus the ends of Tables are commonly *Clamp't* to preserve them from warping.

Compass-saw. See fol. 9. and Plate 4. fig. R.

Cornice. See Plate 6. q. and Plate 7. H.

Cross-grained-stuff. Stuff is *Cross-grained* when a Bough or some Branch shoots out on that part of the Trunk of the Tree; For the Bough or branch shooting forwards, the Grain of that branch shoots forwards also, and so runs a-cross the Grain of the Trunk; and if they be well grown together, it will scarce be perceived in some stuff, but in working; yet in Deal Boards, those Boughs, or Branches are Knots, and easily perceiv'd, and if it grew up young with the Trunk, then instead of a Knot you will find a Curling in the Stuff when it is wrought.

Curling-stuff. If the Bough or Branch that shoots out of the Trunk of a Tree be large, and the stuff in that place sawn somewhat a-slope, when that stuff comes under the Plane you will find a Turning about or Curling on that place upon the Stuff; and in a straight progress of the Plane the Iron will cut with, and suddenly a-cross the Grain, and that more or less as the Bough grew in the youth of the Tree, or grew more or less upright, or else sloping to the Trunk, or was sawn so. Such Stuff therefore is called *Curling-stuff*.

D

D.

Door-case. Is the Fram'd work about the Door.

Double-Screw. See fol. 60. Plate 4. fig. g. on the Work-bench A.

F.

Facia. See Plate 6. *b.*

Fence. See § 8. Use of the Plow, and Pl. 4. fig. B 6.

Fine-set. The Irons of Planes are set Fine, or Rank. They are set fine, when they stand so shallow below the sole of the Plane, that in working they take off a thin shaving. See § 3.

Flat Frieze. See Plate 6. *p.*

Fore-Plane. See § 2. and Plate 4 B 1.

Former. See § 10. and Plate 4. C 1. C 3.

Frame. See fol. 59, 60.

Frame Saw. See § 28. and Plate 4. O.

Free stuff. See § 3.

Frieze. See Plate 6. *p.*

Frieze Pannel. See Plate 7. L.

Frieze Rail. See plate 7. F.

Frowy stuff. See § 3.

G.

Gage. See § 21. and Plate 4. G.

Gimblet. See § 23. and Plate 4 I.

Gouge. See § 14. C 6.

Groove. See fol. 69.

H.

Hammer-hard. See Numb. I. fol. 58.

Handle. See § 15. and Plate 4. D a.

Hard stuff. See § 3.

Q 2

Hatchet.

Hatchet. See § 25. Plate 4 L.

Head. See § 22. Plate 4. H a.

Hold-fast. See § 1. Plate 4. A d.

Hook. See § 1. Plate 4. A b.

Husk. See Plate 6. n.

I

Inner-square. See § 15. and Plate 4. D d.

Joint. See fol 59.

Jointer. See § 4. and Plate 4. B 2.

Iron. See § 2. and Plate 4. B 1 d.

K.

Kerf. The Sawn-away slit between two pieces of stuff, is called a Kerf. See fol 95.

Knob. See § 36. fol. 104. and Plate 5. fig. 7. N.

Knot. See Plate 6. o.

L.

Large Pannel. See Plate 7. K.

Lying Pannel. See Plate 7. I.

Lower Rail. See Plate 7. H.

M.

Margent. See Plate 7. at AAA the flat breadth of the Stiles besides the Moldings, is called the Margent of the Stiles.

Middle Rail. See Plate 7 E E.

Miter. See fol. 60.

Miter Box. See § 20. and Plate 5. fig. 1.

Miter square. See § 18. and Plate. 4. E.

Moldings. The several wrought-work made with Planes on wood, is called *Moldings*. See Plate 6.

Molding Planes. See § 9.

Mortefs.

Mortefs. Is a square hole cut in a piece of stuff, to entertain a Tennant fit to it. See § 17.

Mortefs Chissel. See § 13. and Plate 4. C 5.

Mouth. See § 2. B 7. a The Mouth.

O.

Ogee. See Plate 6. c.

Oval. See § 21. and Plate 4. G. b.

Outer Square. See § 15. and Plate. 4. D c.

P.

Pad. See § 22 and Plate 4. H b.

Pannel. In Plate 7. I K L are Pannels, but distinguished by their positions.

Pare. The smooth cutting with the Paring-Chissel is called *Paring*.

Paring-Chissel. See § 11. and Plate 4. C 2.

Pilaster. See Plate 6. f.

Peircer. See § 22. and Plate 4. H.

Pit-man. The Sawyer that works in the Pit, is called the Pit-man.

Pit-Saw. The Pit-Saw is a great Saw fitted into a square Frame; as in Plate 4. M is a Pit-Saw.

Planchier. In Plate 6. between d and e is the Planchier.

Plinth. See Plate 6.

Plow. See § 8. and Plate 4. B 6.

Pricker. Is vulgarly called an Awl: yet for Joiners use it hath most commonly a square blade, which enters the Wood better than a round Blade will; because the square Angle in turning it about breaks the Grain, and so the Wood is in less danger of splitting.

R.

R.

Rabbet. See § 7.

Rabbet Plane. See § 7. and Plate 4. B 5.

Rack See Plate 5. Fig. 8. Read § 36.

Rail. See Plate 7. AAA.

Rank. The Iron of a Plane is said to be *set Rank*, when its edge stands so far below the Sole of the Plane, that in working it will take off a thick shaving. See § 3.

Rank-set. See Rank.

Range. The side of any work that runs straight, without breaking into angles, is said to *run Range*: Thus the Rails and Pannels of one straight side of Wain-scoring is said to *run Range*.

Return. The side that falls away from the Fore-side of any Straight or Rank-work, is called the *Return*.

Riglet. Is a flat thin square piece of Wood: Thus the pieces that are intended to make the Frames for small Pictures. &c. before they are Molded are called *Riglets*.

Rub. See fol. 94.

S.

Saw-wrest. See § 26 fol. 94. and Plate 4 O.

Scantlin. The size that your Stuff is intended to be cut to.

Scribe. When Joyners are to fit a side of a piece of Stuff against the side of some other piece of Stuff, and the side of the piece of Stuff they are to fit to is not regular; To make these two pieces of Stuff join close together all the way, they Scribe it, (as they phrase it,) thus; They lay the piece of Stuff they intend to
Scribe

Scribe close against the other piece of Stuff they intend to Scribe to, and open their Compasses to the widest distance, these two pieces of Stuff bear off each other: Then (the Compasses moving stiff in their Joint) they bear the point of one of the shanks against the side they intend to Scribe to, and with the point of the other shank they draw a line upon the Stuff to be Scribed; and then the points of the Compasses remaining unremov'd, and your hand carried evenly along by the side of the piece to be Scribed to, that line scribed upon the piece intended to be Scribed, shall be parallel to the irregular side intended to be Scribed to: And if you work away your Stuff exactly to that line, when these two pieces are put together, they shall seem a Joint.

Shoot a Joint. See fol. 59.

Skew-former. See § 12, and Plate 4. C 4.

Smoothing Plane. See § 6. and Plate 4. B 4.

Sole. See Plate 4. B 7. *h a b.* The under-side of a Plane is called the *Sole*.

Square. See § 15. and Plate 4. D.

Staff. See § 21. and Plate 4. G c.

Staves. See § 8. and Plate 4. B 6. *a a.*

Stile. The upright Pieces AA in Pl. 7. are *Stiles*.

Stock. See § 22. and Plate 4. H c.

Stops. In Plate 6 *k k* are *Stops*.

Stuff. The Wood that Joiners work upon they call in general *Stuff*.

Sur-base. In Plate 7. D is the *Sur-base*.

Swelling-Frieze. In Plate 6. *r* is the *Swelling-frieze*.

T.

Table. In Plate 6. *f* is the *Table*.

Taper. All sorts of Stuff or work that are smaller at one

one end than at the other, and diminish gradually from the biggest end, is said to be *Taper*.

Tennant. Is a square end fitted into a Mortise.
See § 17.

Tennant Saw. In Plate 4. O. would be a Tennant Saw, were the flat of the Blade turned where the edge there stands.

Tongue. See § 16. and Plate 4. D b.

Tooth. See § 21. and Plate 4. G a.

Top-man. Of the two Sawyers, the uppermost is called the Top-man.

Tote. See § 2. and Plate 4. B 1 a.

Traverse. See fol. 65.

Trussel. See fol. 97. and Plate 5. Fig. 3.

Try. See § 13.

V.

Vaws-Cornice. See Plate 6. e.

Upper Cornice. See Plate 6. f.

W.

Warp. The same that Cast is.

Waving Engine. See § 36. and Plate 5.

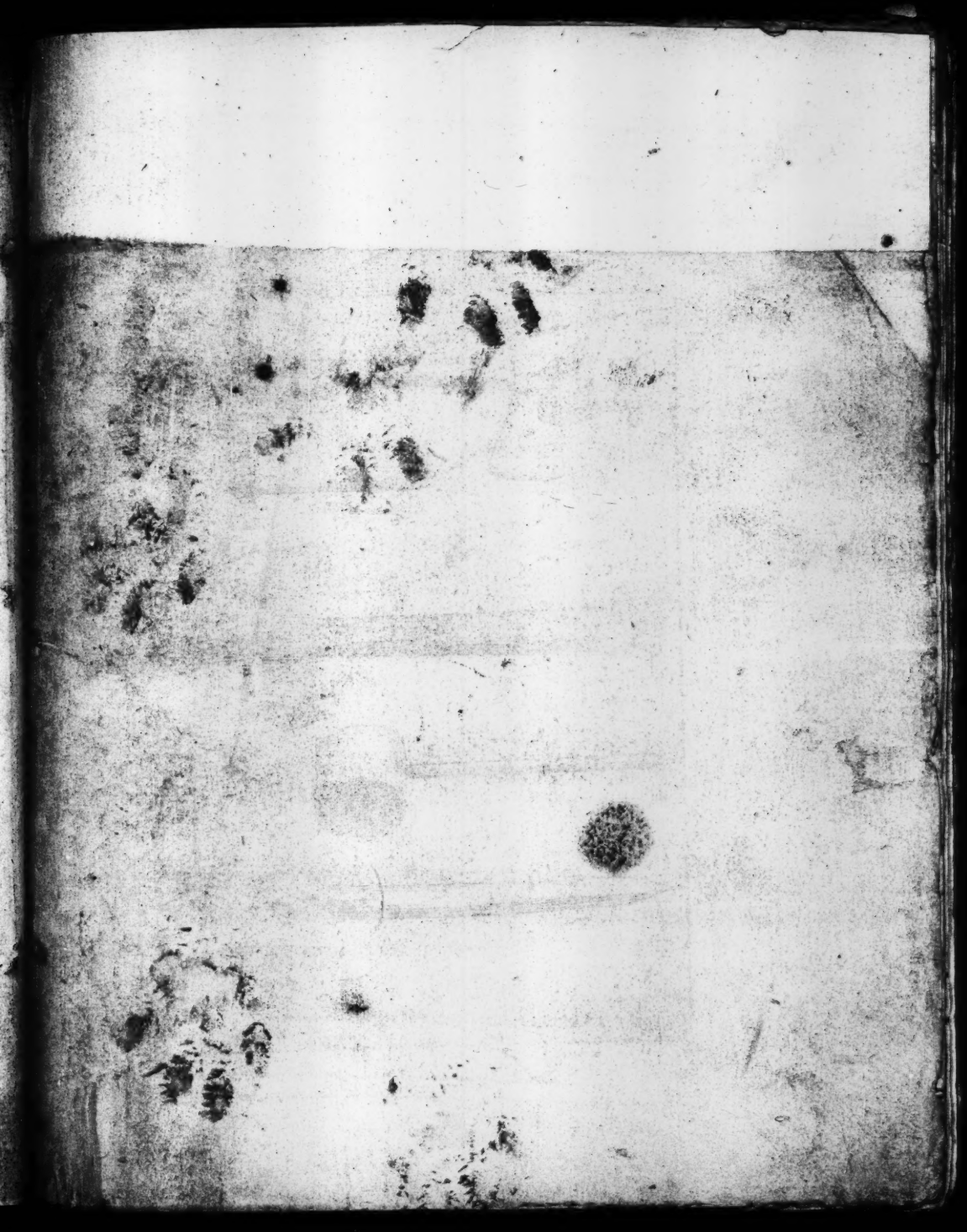
Wedge. See § 2. and Plate 4. B 1. c.

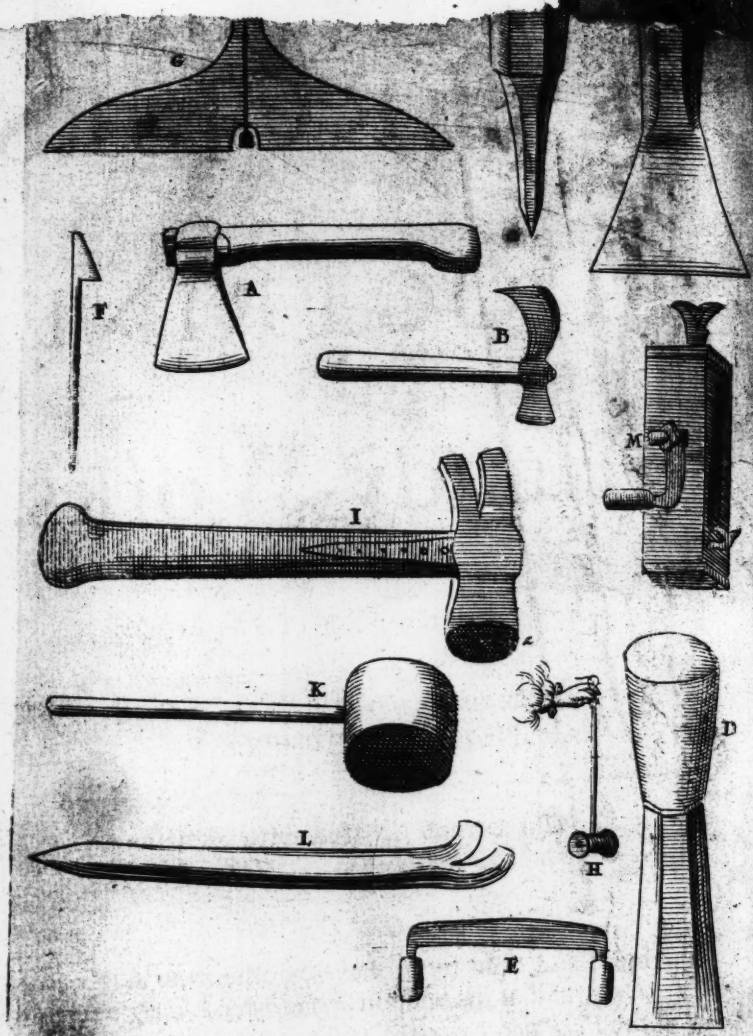
Whetting-Block. See Plate 4. P.

Whip-Saw. See Plate 4. N.

Wrest. See § 26. and Plate 4. Q.

Thus much of Joinery. The next Exercises will (God willing) be of Carpentry.





MECHANICK
EXERCISES:
OR, THE
DOCTRINE
OF
Handy-Works.

Applied to the ART of *House-Carpentry*.

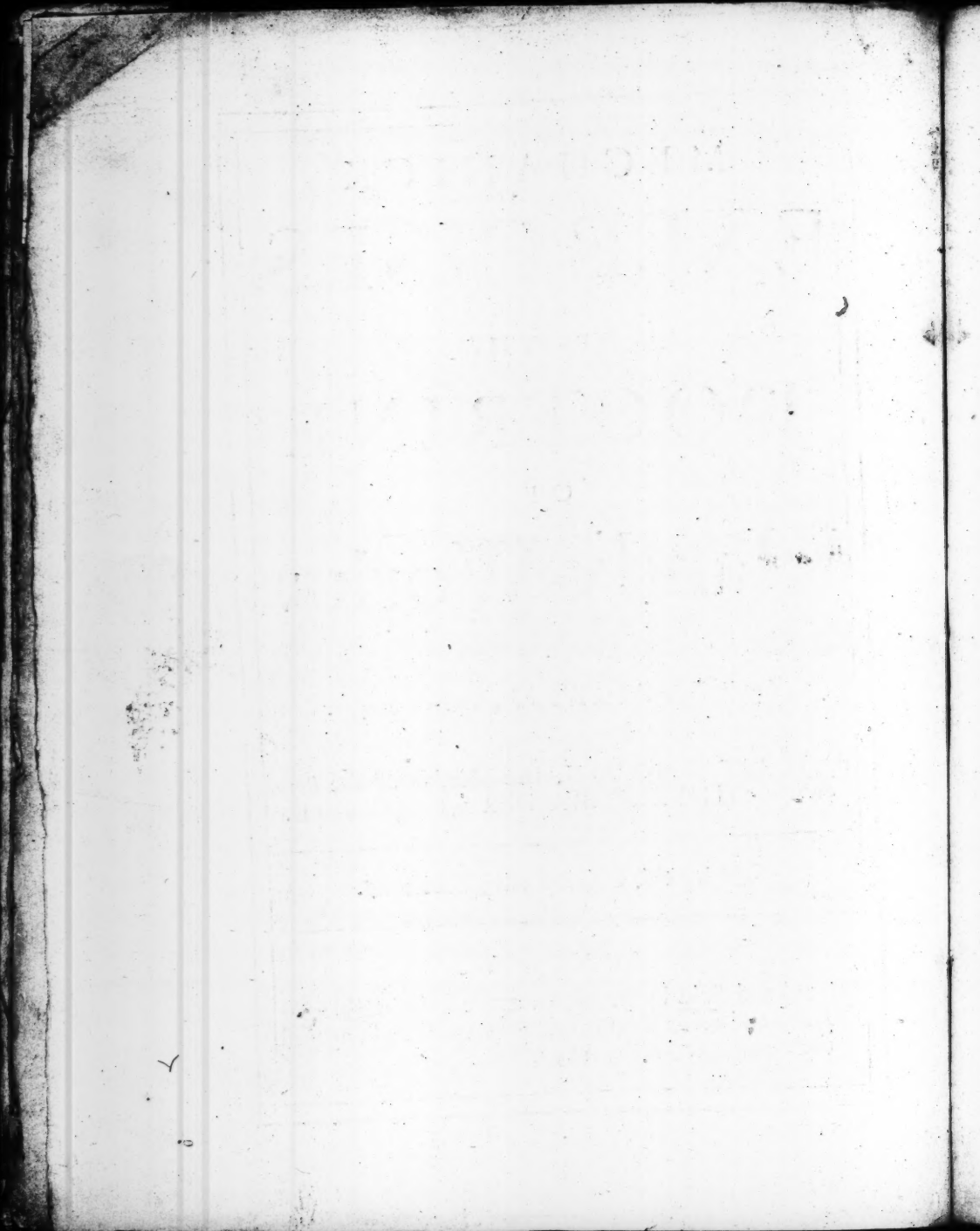
By JOSEPH MOXON, late Member of the *Royal Society*, and HYDROGRAPHER to King Charles II.

The Second Edition with Additions.

L O N D O N,

Printed and Sold by J. Moxon, at the *Atlas* in *Warwick-Lane*, and at his Shop in *Westminster-hall* right against the *Parliament Stairs*, 1694.





MECHANICK EXERCISES:

O R,

The Doctrine of *Handy-Works*.

Applied to the ART of *House-Carpentry*.

BEing now come to exercise upon the *Carpenters* Trade, it may be expected, by some, that I should insist upon *Architecture*, it being so absolutely necessary for Builders to be acquainted with : But my Answer to them is, that there are so many Books of Architecture extant, and in them the Rules so well, so copiously, and so compleatly, handled, that it is needless for me to say any thing of that Science : Nor do I think any man that should, can do more than collect out of their Books, and perhaps deliver their Meanings in his own Words. Besides, *Architecture* is a Mathematical Science, and therefore different from my present undertakings, which are (as by my Tittle) Mechanick Exercises : yet because Books of Architecture are as necessary for a Builder to understand as the use of Tools ; and lest some Builders should not know how to enquire for them, I shall at the latter end of *Carpentry* give you the Names of some Authors, especially such as are printed in the English Tongue.

Some may perhaps also think it had been more proper for me in these Exercises to have introduced

R

Car-

Carpentry before Joynery, because Necessity (the Mother of Invention) did doubtless compel our Fore-fathers in the beginning to use the conveniency of the first, rather than the extravagancy of the last. I confess, I considered it my self, and had in my own reason been persuaded to it, but that I also considered, that the Rules they both work by are upon the matter the same, in *Sawing, Mortessing, Tenanting, Scribing, Paring, Plaining, Moulding, &c.* and likewise the Tools they work with the same, though some of them somewhat stronger for Carpenter's use than they need be for Joyners; because Joyners work more curiously, and observe the Rules more exactly than Carpenters need do. And therefore I say it was, that I began with Joyners before Carpentry; for he that knows how to work curiously, may, when he lists, work slightly; when as they that are taught to work more roughly, do with greater difficulty perform more curious and nice work. Thus we see Joyners work their Tables exactly flat and smooth, and shoot their Joint so true, that the whole Table shews all one piece: But the Floors Carpenters lay are also by the Rule of Carpentry to be laid flat and true, and shall yet be well enough laid, though not so exactly flat and smooth as a Table.

Yet though the Rules Joyners and Carpenters work by are so near the same, and the Tools they work with, and Stuff they work upon, the same; yet there are many Requisites proper to a Carpenter, (especially a Master Carpenter) that a Joyner need take little notice of, which after I have described the Carpenters Tools that are not exprest among the Joyners, I shall speak to.

§ 1. *Of several Tools used in Carpentry, that are not used in Joynery. And first of the Ax*

THe *Ax* marked *A* in *Plate 8.* is (as you see) different from what the Joyners Hatcher is, both in size and form; theirs being a light Hatcher, with a Basil edge on its left side, because it is to be used with one hand, and therefore hath a short Handle: But the Carpenter's *Ax* being to hew great Stuff, is made much deeper and heavier, and its edge tapering into the middle of its Blade. It hath a long Handle, because it is used with both their hands, to square or bevel their Timbers.

When they use the *Ax*, the Timber hath commonly some *Bauk* or *Log* laid under it near each end, that the edge of the *Ax* may be in less danger of striking into the ground, when they hew near the bottom of the Timber. And they commonly stand on that side the Timber they hew upon.

§ 2. *Of the Adz, and its use.*

THe *Adz* marked *B* in *Plate 8.* hath its Blade made thin, and somewhat arching. As the *Ax* hath its edge parallel to its Handle, so the *Adz* hath its edge athwart the Handle, and is ground to a Basil on its inside to its outer edge: wherefore when it is blunt they cannot well grind it, unless they take its Helve out of its Eye.

Its general use is to take thin Chips off Timber or Boards, and to take off those irregularities that the *Ax* by reason of its form cannot well come at; and that a Plain (though rank set) will not make riddance enough with.

It is most used for the taking off the irregularities on the framed work of a Floor, when it is framed and pin'd together, and laid on its place ; for that lying flat under them, the edge of the *Ax* being parallel to its Handle (as aforesaid) cannot come at the irregularities to take them off; but the *Adz* having its edge athwart the Handle will. Again, upon some Posts framed upright, and range with other framed work close to it, the edge of the *Ax* cannot come at the irregularities (for the reason aforesaid) but the *Adz* will. And the like for the irregularities of framed work on a Ceiling, &c.

When they work upon the framed work of a Floor, they take the end of the Handle in both their hands, placing themselves directly before the irregularity, at a small distance, stradling a little with both their Legs, to prevent danger from the edge of the *Adz*, and so by degrees hew of the irregularity. But if they hew upon an Upright, they stand directly before it.

They sometimes use the *Adz* upon small thin Stuff, to make it thinner, (but this is many times when the *Ax*, or some other properer Tool, lies not at hand) and then they lay their Stuff upon the Floor, and hold one end of it down with the Ball of the Foot, if the Stuff be long enough ; if not, with the ends of their Toes, and so hew it lightly away to their size, or form, or both.

§ 3. Of Carpenters Chissels in general.

THough Carpenters for their finer work use all the sorts of *Chissels* described in *Exercise 4.* yet are not those sorts of *Chissels* strong enough for their rougher and more common work, and therefore they also use a stronger sort of *Chissels*; and distinguish them by the name of *Socket-Chissels*: For whereas those *Chissels* Joyners use have their wooden heads made hollow to receive the Iron Sprig above the Shoulder of the Shank, Carpenters have their Shank made with an *hollow Socket* at its top, to receive a strong wooden Sprig made to fit into that Socket, with a square Shoulder above it, the thickness of the Iron of the Socket, or somewhat more; which makes it much more strong, and able to endure the heavy blows of the *Mallet* they lay upon the head of the *Chissel*. And the Shanks and Blades are made stronger for Carpenters use than they are for Joyners.

Of these *Socket Chissels* they have of the several sorts described in Joinery, though not all severally distinguished by their names; for they call them *Half-Inch*, *Three-quarter-Inch Chissels*, *Inch and half*, *Two-Inch*, to *Three-Inch Chissel*, according to the breadth of the Blade. But their Uses are the same mentioned in Joinery, though the manner of using them be somewhat different too: For, as I told you in Joinery, the Joyners press the edge of the Blade into the Stuff, with the strength of their Shoulders, but the Carpenters with the force of the blows of the *Mallet*. And the Joyners guide their *Chissels* differently from what the Carpenters do their *Socket Chissels*; for the Joyners hold the Shank and Blade of their *Chissels*, as I described in
Numb.

Numb. 4. Sect. 11. but the Carpenters hold the Shank of their *Chissels* in their clutched left hand, and beat upon the Head with the *Mallet* in the right. See the Figure of the *Socket Chissel* in *Plate 8. C.* with its Head a out of the *Socket*.

§ 4. *Of the Ripping Chissel, and its use.*

THe *Ripping Chissel* described *Plate 8. D.* is a *Socket Chissel*, and is about an Inch broad, and hath a blunt edge. Its edge hath not a *Bafil*, as almost all other *Chissels* have, and therefore would more properly be called a *Wedge* than a *Chissel*. But most commonly Carpenters use an old cast off *Chissel* for a *Ripping Chissel*.

Its office is not to cut Wood, as others do, but to *rip* or *tear* two pieces of wood fastned together from one another, by entering the blunt edge of it between the two pieces, and then knocking hard with the *Mallet* upon the head of the *Handle*, till you drive the thicker part of it between the two pieces, and so force the power that holds them together (be it *Nails*, or otherwise) to let go their hold: For its blunt edge should be made of *Steel*, and well tempered, so that if you knock with strong blows of the *Mallet* the *Chissels* edge upon a *Nail* (though of some considerable substance) it may cut or brake it short asunder. If you cannot, at once, placing the *Ripping-Chissel* part the two pieces, you must use two *Ripping-Chissels*, placing the second at the remotest entrance in the breach, and driving that home will both open the breach wider, and loosen the first *Ripping-Chissel*, so that you may take it out again, and place it farther in the breach: And so you must continue edging farther

ther and farther, till you have separated your intended pieces.

It is sometimes used when Carpenters have committed error in their work, and must undo what they did, to mend it. But it is generally used in all Alterations, and old work.

§ 5. *Of the Draw-knife, and its use.*

THE *Draw-knife* described *Plate 8. E.* is seldom used about House-building, but for the making of some sorts of Household-stuff; as the Legs of Crickets, the Rounds of Ladders, the Rails to lay Cheefe or Bacon on, &c.

When they use it, they set one end of their work against their Breast, and the other end against their Work bench, or some hollow angle that may keep it from slipping, and so pressing the work a little hard with their Breast against the Bench, to keep it steady in its position, they with the Handles of the *Draw-knife* in both their hands, enter the edge of the *Draw-knife* into the work, and draw Chips almost the length of their work, and so smoothen it quickly.

§ 6. *Of Hook-Pins, and their use.*

THE Hook-Pin is described *Plate 8. F.* *a* the Pin, *b* the Hook, *c* the Head. Its office is to pin the Frame of a Floor or Frame of a Roof together, whilst it is framing, or whilst it is fitting into its position. They have many of these *Hook-Pins* to drive into the several angles of the Frame. These they drive into the Pin-holes through the Mortesses and Tennants, and being made taper, do with a Hammer striking on the

the bottom of it knock it out again; or they most commonly strike under the Hook, and so knock it out. Then if the Frame lie in its place, they pin it up with wooden Pins.

§ 7. *Of the Level, and its use.*

THe *Level* described *Plate 8. G.* *a a* the *Level*, *b* the *Plumbet*, *c* the *Plumb-line*, *d d* the *Perpendicular* mark'd from the top to the bottom of the Board. The *Level* is from two to ten foot long, that it may reach over a considerable length of the Work. If the *Plumb-line* hang just upon the *Perpendicular d d*, when the *Level* is set flat down upon the work, the work is *Level*: But if it hang on either side the *Perpendicular*, the Floor, or Work, must be raised on that side, till the *Plumb-line* hang exactly upon the *Perpendicular*.

§ 8. *Of the Plumb-line, and its use.*

THe *Plumb-line* is described *Plate 8. H.* *a* the *Line Rowl*, *b* the *Line*. It is used to try the upright standing of Posts, or other work that is to stand perpendicular to the Ground Plot; and then they draw off so much *Line* as is necessary, and fasten the rest of the *Line* there, upon the *Line Rowl* with a Slip-knot, that no more *Line* turn off. They hold the end of the *Line* between their Finger and Thumb half the Diameter of the *Line Rowl* off one corner of the Post, or Work, and if the *Line* and Corner of the Post be parallel to each other, the Post is upright: But if the Post be not parallel to the *Line*, but its bottom stands more than half the Diameter of the *Line Rowl* from

from the *Line*, the Post hangs so much over the bottom of the Post on that side the *Line* bears off, and must be forced backwards till the side of the Post and the *Line* become parallel to each other. But if the bottom of the corner of the Post stands out from the top of the *Line*, the Post must be forced forwards to comply with the *Line*.

§ 9. Of the Hammer, and its use.

THe Hammer is described Plate 8. I. *a* the Face, *b* the Claw, *c c* the Pen at the return sides of the Claw. This Tool was forgot to be described in *Joyner*, though they use *Hammers* too, and therefore I bring it in here. Its chief use is for driving Nails into work, and drawing Nails out of work.

There is required a pretty skill in driving a Nail; for if (when you set the point of a Nail) you be not curious in observing to strike the flat face of the *Hammer* perpendicular down upon the Perpendicular of the Shank, the Nail (unless it have good entrance) will start aside, or bow, or break; and then you will be forced to draw it out again with the Claw of the *Hammer*. Therefore you may see a reason when you buy a *Hammer*, to chuse one with a true flat Face.

A little trick is sometimes used among some (that would be thought cunning Carpenters) privately to touch the head of the Nail with a little Ear-wax, and then lay a wager with a stranger to the Trick, that he shall not drive that Nail up to the Head with so many blows. The stranger thinks he shall assuredly win, but does assuredly lose; for the *Hammer* no sooner touches the Head of the Nail, but instead of entring the wood

it flies away, notwithstanding his utmost care in striking it down-right.

§ 10. *Of the Commander, and its use.*

THe *Commander* is described *Plate 8. K.* It is indeed but a very great wooden *Mallet*, with an *Handle* about three foot long, to use in both the hands.

It is used to knock on the *Corners* of *Framed work*, to set them into their position. It is also used to drive small wooden *Piles* into the ground, &c. or where greater *Engines* may be spared.

§ 11. *Of the Crow, and its use.*

THe *Crow* is described in *Plate 8. L.* *a* the *Shank*, *b b* the *Claws*, *c* the *Pike-end*. It is used as a *Lever* to to lift up the ends of great heavy *Timber*, when either a *Bauk*, or a *Rowler*, is to be laid under it; and then they thrust the *Claws* between the *Ground* and the *Timber*, and laying a *Bauk*, or some such stuff behind the *Crow*, they draw the other end of the *Shank* backwards, and so raise the *Timber*.

§ 12 *Of the Drug, and its use.*

THe *Drug* described *Plate 9. A.* is made somewhat like a low narrow *Carr*. It is used for the carriage of *Timber*, and then is drawn by the *Handle a a*, by two or more men, according as the weight of the *Timber* may require.

There are also some *Engines* used in *Carpentry*, for the management of their heavy *Timber*, and hard
La-

Labour, viz. the *Jack*, the *Crab*, to which belongs Pullies and Tackle, &c. Wedges, Rowlers, great Screws, &c. But I shall give you an account of them when I come to the explanation of Terms at the latter end of *Carpentry*.

§ 13. *Of the Ten-foot Rod, and thereby to measure and describe the Ground-plot.*

WE shall begin therefore to measure the *Ground-plot*, to which Carpenters use a *Ten-Foot Rod* for expedition, which is a Rod about an Inch square, and ten foot long; being divided into ten equal parts, each part containing one foot, even as the *Two-foot Rule* described in *Exercise 6*. § 13. is divided into 24 equal parts, and their Sub-divisions.

With this *Rod* they measure the length and breadth of the *Ground-plot* into Feet, and if there be odd Inches, they measure them with the *Two-foot Rule*. Their measure they note down upon a piece of paper, and having considered the situation of the Sides, *East*, *West*, *North*, and *South*, they draw on Paper their several Sides accordingly, by a small Scale, either elected, or else made for that purpose. They may elect their *Two-foot Rule* for some plots; for an Inch and an half may commodiously serve to set off one Foot on some small *Ground-plots*, and then you have the Inches to that Foot actually divided by the Marks for the half quarters on the *Two-foot Rule*. But this large Scale will scarce serve to describe a *Ground-plot* above ten Foot in length, because a small sheet of Paper is not above 15 or 16 Inches long, and therefore one sheet of Paper will not contain it, if the *Ground-plot* be longer: Therefore if you make every half quarter of an

Inch to be a Scale for two Inches, a sheet of Paper will contain 20 Foot in length: And if you make every half quarter of an Inch to be a Scale for four Inches, a sheet of Paper will contain 40 Foot. And thus by diminishing the Scale, the sheet of Paper will contain a grater number of Feet.

But having either elected, or else made your Scale, you are to open your Compasses to the number of Feet on your Scale your *Ground-plot* hath in length, and then transfer that distance to your Paper, and to draw a straight Line between the two Points, and mark that straight Line with *East, West, North, or South*, according to the situation of that side of the *Ground-plot* it represents. Then again open your Compasses to the number of Feet on your Scale one of the adjoining sides contains, and transfer that distance also to your Paper, and draw a Line between the two points, and note its situation of *East, West, North, or South*, as before. Do the like by the other sides; and if either a Quirk, or any Addition, be added to the Building, on any side of your *Ground-plot*, you must describe it also proportionably.

Then you are to consider what Apartments, or Partitions, to make on your *Ground-plot*, or second, or third Story, and to set them off from your Scale, beginning at your intended Front. As for example, Suppose your *Ground-plot* be a Long-square, 50 Foot in length, and 20 Foot wide: This *Ground-plot* will contain in its length two good Rooms, and a Yard behind it 10 Foot long. If you will, you may divide the 40 Foot into two equal parts, so will each Room be 20 Foot square: Or you may make the Rooms next the Front deeper, or shallower, and leave the remainder for the Back-Room: As here the Front
Room.

Room is 25 Foot, and the Back-Room 15 Foot deep, and a setting off of 8 Foot broad and 10 Foot long taking out of the Yard, for a Buttery below stairs (if you will) and Closets above stairs over it. But what width and depth soever you intend your Rooms shall have, you must open your Compasses to that number of Feet on your Scale, and set off that Distance on the *East*, *West*, *North*, or *South*, Line, according to the Situation of that side it represents on your *Ground-plot*. If you set it off the *East* Line, you must also set it off on the *West*; if on the *North* Line, you must also set it off on the *South* Line: Because between the two Settings off on the *East* and *West* Lines, or *North* or *South* Lines, you must draw a straight Line of the length of your intended Partition. And in this manner you must from every Partition draw a Line in its proper place on the Paper, by measuring the Distances each Partition must have from the outside of the *Ground-plot*.

And thus you are also to describe by your Scale your Front, and several sides of the Carcase; allowing the *Principal Posts*, *Posts*, *Enterduces*, *Quarterings*, *Braces*, *Gables*, *Doors*, *Windows*, and *Ornaments*, their several sizes, and true positions by the Scale: Each side upon a Paper by it self: Unless we shall suppose our Master-Workman to understand *Perspective*; for for then he may, on a single piece of Paper, describe the whole Building, as it shall appear to the Eye at any assigned station.

§ 14. Of Foundations.

HAVING drawn the *Draft*, the Master-Workman is first to cause the Cellars to be dug, if the House shall have Cellars. And then to try the Ground, that it be all over of an equal firmness, that when the weight
of

of the Building is set upon it, it may not sink in any part. But if the Ground be hollow or weaker in any place, he strengthens it, sometimes by well ramming it down, and levelling it again with good dry Earth, Lime-Core, Rubbish, &c. or sometimes with ramming in Stones, or sometimes with well Planking it; or most securely by driving in Piles. But driving in of Piles is seldom used for Timber Houses, but for Stone, or Brick Houses, and that but in few places of *England* neither, but where the Ground proves *fenny*, or *moorish*. Therefore a farther account shall be given of Foundations, when I come to exercise upon *Masonry*, &c.

Then are the Celler-Walls to be brought up by a *Bricklayer* with *Brick*; for small Houses two Bricks thick, for bigger two and an half Bricks thick, or three or four Bricks thick, according to the bigness of the House, and quality of the Ground, as I shall shew when I come to Exercise on *Bricklaying*.

But if the House be designed to have no Cellars (as many Country-Houses have not) yet for the better securing the Foundation, and preserving the Timber from rotting, Master-Workmen will cause three, or four, or five course of Bricks to be laid, to lay their *Ground-plates* upon that Foundation.

The Foundation being made good, the Master-workman appoints his under-workmen their several *Scantlins*, for *Ground-plates*, *Principal Posts*, *Posts*, *Bressummers*, *Girders*, *Trimmers*, *Joysts*, &c. which they cut square, and frame their Timbers to, as has been taught in the several Exercises upon *Joyner*y, (whither I referr you) and there set them up, each in his proper place, according to the Draft.

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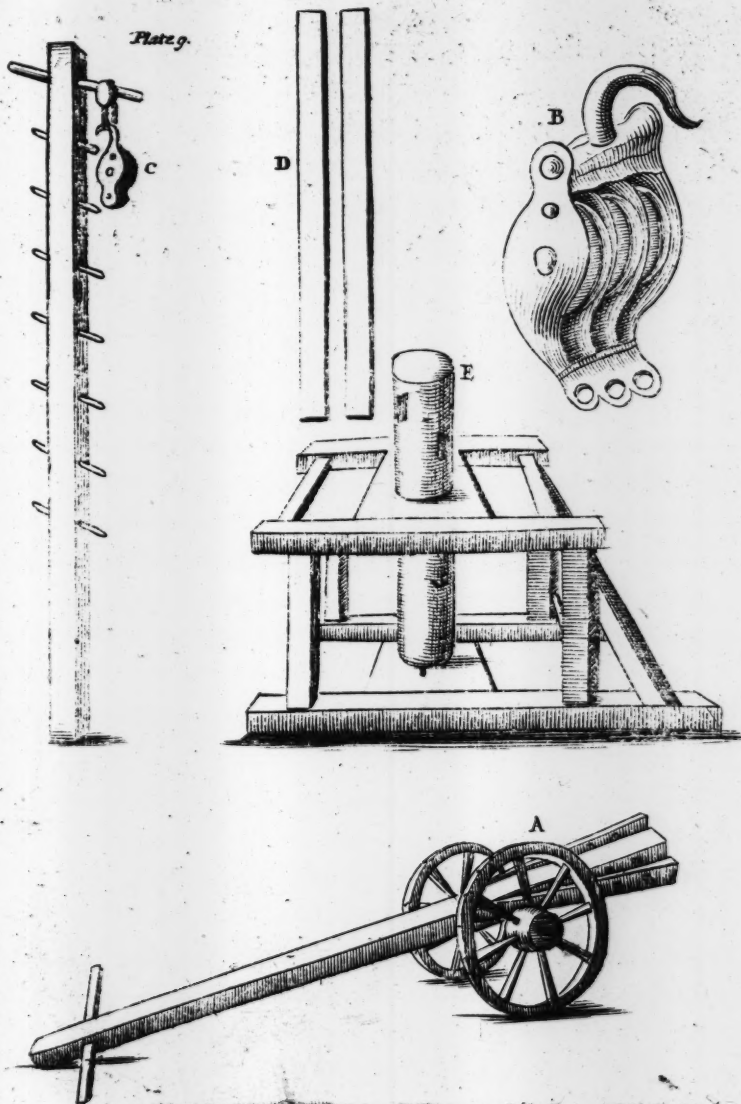
The Draft of a Foundation I have described in *Plate 10*, according to a Scale of eight Foot in an Inch; where you have the Front A B 20 Foot long, the sides A C and B D 50 Foot long. The Shop, or first Room, E E 25 Foot (as aforesaid) deep. I make the first Room a Shop, because I intend to describe *Shop-windows*, *Stalls*, &c. though you may Build according to any other purpose: the *Kitching*, or *Back Room* F F 15 Foot deep. A *Buttry*, or *Closet*, taken out of the *Tard*, marked G, 10 Foot deep, and 8 foot wide. H a *Setting off* in the *Tard*, 4 Foot square for the *House of Office*. I *Leaving way* in the Shop for a *Stair-Case* 6 foot, and 11 foot. K the *Tard*. L the *Sink-hole* 1 foot square. M *Leaving way* in the *Kitching* 6 foot deep, and 4 foot wide for the *Chimneys*.

I do not deliver this Draft of Partitions for the most commodious for this Ground-plot, nor is the House set out designed for any particular Inhabitant; which is one main purpose to be considered of the Master-Workman, before he make his Draft; for a Gentleman's house must not be divided as a Shop-keeper's, nor all Shop-keepers Houses a-like; for some Trades require a deeper, others may despench with a shallower Shop, and so an inconvenience may arise in both. For if the Shop be shallow, the Front Rooms upwards ought to be shallow also: because by the strict Rules of *Architecture*, all Partitions of Rooms ought to stand directly over one another: for if your Shop stands in an eminent Street, the Front Rooms are commonly more Airy than the Back Rooms; and always more commodious for observing publick Passages in the Street, and in that respect it will be inconvenient to make the Front Rooms shallow: But if you have a fair Prospect backwards of Gardens, Fields, &c. (which seldom happens.

pens in Cities) then it may be convenient to make your Back-Rooms the larger for Entertainment, &c. But I shall run no farther into this Argument: for I shall leave the Master-workman to consult Books of *Architecture*, and more particularly the Builder, which, in this case, they all ought to do.

MECHANICK

Plate 9.





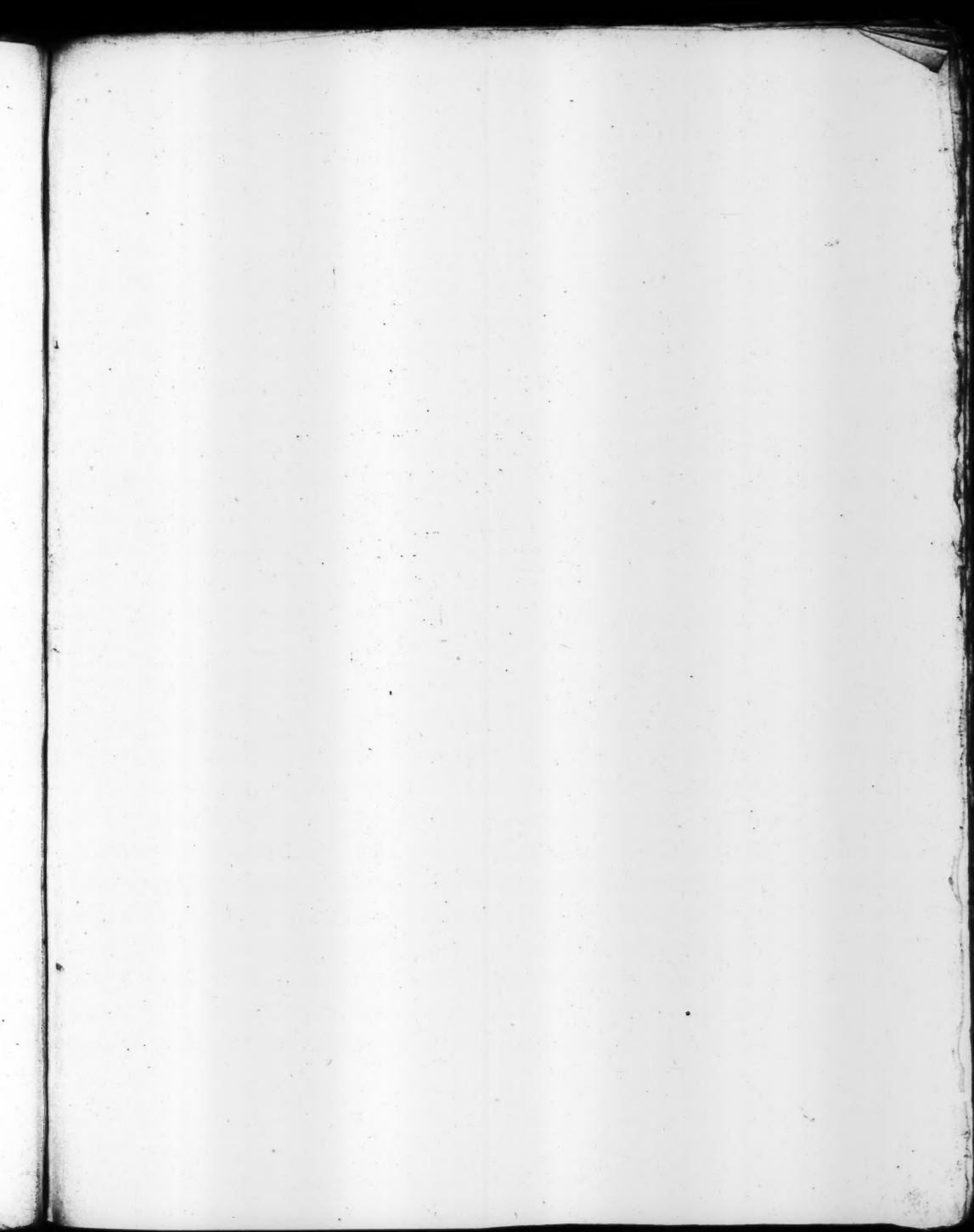
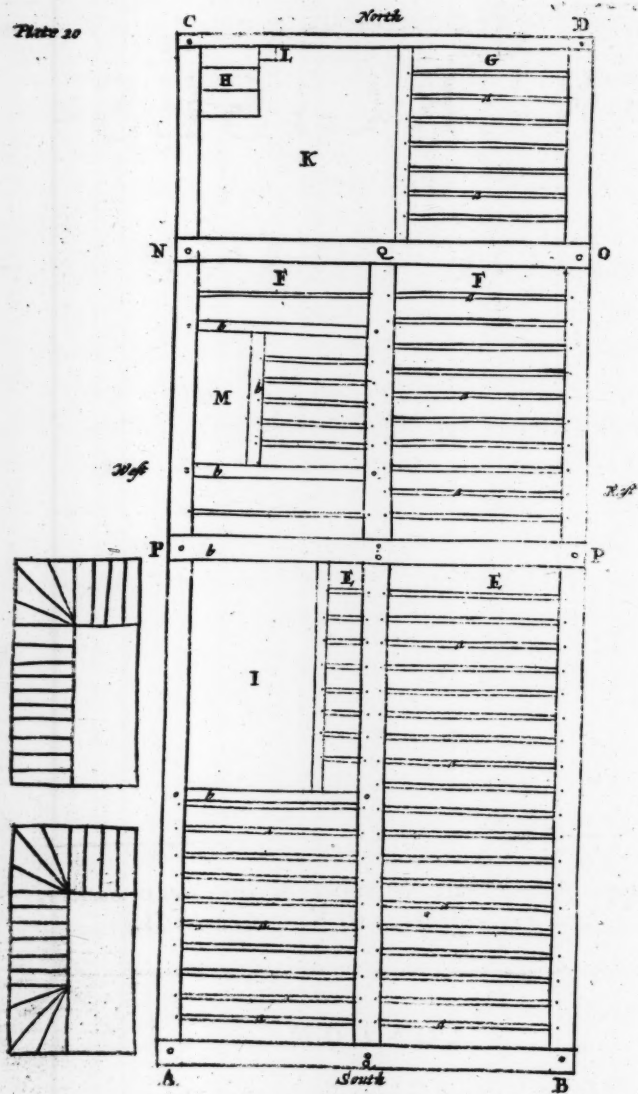


Plate 20



MECHANICK
EXERCISES:
OR, THE
DOCTRINE
OF
HANDY-WORKS.



By *Joseph Moxon*, late Member of the *Royal Society*,
and *Hydrographer* to King *Charles II.*

LONDON,
Printed and Sold by *J. Moxon*, 1694.

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MECHANICK EXERCISES:

OR,

The Doctrine of *Handy-Works*.

Continued in the ART of *House-Carpentry*.

AC, BD, CD, NO, *Ground-plates, Wall-plates, Bressummers, Lintels, the Thickness of the Wall.*

AB, *Also a Ground-plate, or Ground-sell.*

PP, *The Summer.*

QQQ, *Girders.*

I, *The Well-houle for the Stairs, and Stair-case.*

M, *Leaving a way for the Chimnies.*

bb, *Trimmers for the Chimney-way and Stair-case.*

aaa, *Joysts.*

§ 15. *Of Framing for the Floors.*

THe four Plates, **AB, AN, NO** and **BO**, lying on the Foundation, are called *Ground-plates*. They are to be of good Oak, and for this size of Building about 8 Inches broad, and 6 Inches deep. They are to be framed into one another with Tennants and Mortesses. The longer Ground-plates **AN** and **BO** are commonly tennanted into the Front and Rear Ground-plates **AB** and **NO**, and into these two sides-Ground-plates are Mortesses made for the Tennants at the ends of the Joysts, to be fitted somewhat loosely in, at about 10 Inches distance from one another, as in the Draft. These Ground plates are to be bor'd with

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an

an Inch and half *Augur*, and well pinned into one another with round Oaken Pins, made tapering towards the point, and so strong, that with the hard blows of a Mallet, they may drive stiff into the *Augre-hole*, and keep the Tennant firmly in the Mortels. The manner of making a Tennant and Mortels is taught in *Exercise* 5. § 17. But because the Stuff *Carpenters* work upon, is generally heavy Timber, and consequently not so easily mannaged as the light Stuff *Joyners* work upon; therefore they do not at first pin their Tennants into their Mortesses with wooden pins, lest they should lie out of square, or any other intended Position: but laying a *Block*, or some other piece of Timber, under the corner of the Framework to bear it hollow off the Foundation, or what ever else it lies upon, they drive *Hook Pins* (described *Plate* 8. § 6.) into the four *Augre-holes* in the corners of the Ground-plates, and one by one fit the Plates either to a square, or any other intended Position: and when it is so fitted, they draw out their *Hook Pins*, and drive in the Wooden Pins (as aforesaid) and taking away the wooden *Blocks* one by one from under the corners of the Frame, they let it fall into its place.

But before they pin up the Frame of Ground-plates, they must fit in the *Summer* marked P P, and the *Girders* Q Q, and all the *Joysts* marked a a a a, &c. and the *Trimmers* for the *Stair-case*, and *Chilmney way* marked b b, and the binding *Joysts* marked c c, for else you cannot get their Tennants into their respective Mortels holes. But they do I say fit all these in while the frame of Ground-plates lies loose, and may, corner by corner, be opened to let the respective Tennants into their respective Mortesses, which when all is done, they frame the *Raising-plates* just as the *Ground-plates* are framed;

framed ; and then frame the Roof into the *Raising-plates* with *Beams*, *Joysts*, &c.

The *Summer* is in this Ground-plate placed at 25 foot distance from the Front, and is to be of the same Scantlin the principal Plates are of, for Reasons as shall be shewn hereafter: and the *Girders* are also to be of the same Scantlin the *Summers* and *Ground-Plates* are of, though according to the nice Rules of *Architecture*, the *Back-Girder* need not be so strong as the *Front-Girder*, because it Bears but at 14 foot length, and the *Front-Girder* Bears at 24 foot length: yet Carpenters (for uniformity) generally make them so, unless they build an House by the great, and are agreed for the Sum of Money, &c.

The *Joysts* Bearing at 8 Foot (as here they do) are to be 7 Inches deep, and 3 Inches Broad.

The *Trimmers* and *Trimming Joysts* are 5 Inches broad and 7 Inches deep, and these *Joysts*, *Trimmers* and *Trimming-Joysts*, are all to be pinned into their respected Mortesses; and then its flatness try'd with the *Level*, as was taught § 7.

§ 16 Of setting up the Carcass.

Though the *Ground-plates*, *Girders*, &c. be part of the *Carcass*, yet I thought fit in the last Section they should be laid, before I treated of the u perstructure, which I shall now handle. The four *Corner Posts* called the *Principal Posts* marked A A, should be each of one piece, so long as to reach up to the *Beam* of the *Roof*, or *Raising-Plate*, and of the same Scantlin the *Ground Plates* are of, viz. 8 Inches broad, and 6 Inches thick, and set with one of its narrowest sides towards the Front. Its lower

end is to be Tennanted, and let it into a Mortels made near the corner of the *Ground-Plate* Frame; and its upper end hath also a Tennant on it, to fit into a Mortels made in the Beam of the Roof, or *Raising-piece*.

At the heighth of the first Story in this Principal Post, must be made two Mortesses, one to receive the Tennant at the end of the Bressummer that lies in the Front, and the other to entertain the Tennant at the end of the Bressummer that lies in the Return-side.

Two such Mortesses must also be made in this Principal Post at the height of the second Story, to receive the Tennant at the ends of the Bressummers for that Story.

Though I have spoken singularly of one *Principal Post*, yet as you work this, you must work all four *Principal Posts*; and then set them plumb upright, which you must try with a Plumb-line described in *Plate 8 §.*

Having erected the *Principal Posts* upright, you must enter the Tennants of the Bressummers into their proper Mortesses, and with a Nail or two (about a single Ten or adouble Ten) tack one end of a deal Board, or some other like piece of stuff to the Bressummer, and the other end to the fram'd work of the Floor, to keep the *Principal Posts* upright, and in their places. Then set up the several Posts between the *Principal Posts*; but these Posts must be Tennanted at each end, because they are to be no longer than to reach from Story to Story, or from Entertise to Entertise, and are to be framed into the upper and under Bressummer. If the Entertises be not long enough, they set up a Principal Post between two or three lengths, to reach from the Ground-plate up to the Raising-plates.

It

It is to be remembred, that the Bressummers and Girders are laid flat upon one of their broadest sides, with their two narrowest sides perpendicular to the Ground-Plot; but the Joysts are to be laid contrary: for they are framed so as to lie with one of their narrowest sides upwards, with there two broadest sides perpendicular to the Ground-Plot. The reason is, because the Stuff of the Bressummers and Girders are less weakned by cutting the Mortesses in them in this position, than in the other position; for as the Tennants for those Mortesses are cut between the top and bottom sides, and the flat of the Tennants are no broader than the flat of the narrowest side of the Joysts; so the Mortesses they are to fit into, need be no broader than the breadth of the Tennant, and the Tennants are not to be above an inch thick, and consequently the Mortesses are to be made with an Inch Mortess-Chissel, as was shewn Numb. 5. § 17. for great care must be taken that the Bressummers and Girders be not weakned more than needs, lest the whole Floor dance.

These Tennants are cut through the two narrowest sides, rather than between the two broadest sides, because the stuff of the Girders retains more strength when least of the Grain of the stuff is cut: And the Tennants being made between the narrowest sides of the Joyces, requires their Mortess-holes no longer than the breadth of that Tennant: And that Tennant being but an Inch thick, requires its Mortess but an Inch wide to receive it; so that you Mortess into the Girder no more than three Inches wide with the Grain of the Stuff, and one Inch broad contrary to the Grain of the Stuff. But should the Tennant be cut between the two broad sides of the Joysts, the Mortess would be three Inches long, and but one Inch broad,

broad, and consequently, you must cut into the Girder three Inches cross the Grain of the Stuff, which would weaken it more than cutting six Inches with the Grain and one Inch cross.

But it may be objected that the Tennants of the Joysts being so small, and bearing at an inch thickness must needs be too weak.

Answer, first though the Tennants be indeed but an Inch thick, and three Inches broad; yet the whole Bearing of the Joyces do not solely depend upon their Tennants; because the Girders they are framed into, prove commonly somewhat Wainny upon their upper sides, and the Joysts are always scribed to project over that Waynniness, and so strengthen their Bearing by so much as they project over the roundness or waynniness of the upper side of the Girder.

Secondly, the Floor is boarded with the length of the Boards athwart the Joysts, and these Boards firmly railed down to the Joysts, which also adds a great strength to them.

Thirdly, The Joysts are seldom made to Bear as at above ten foot in length, and should by, the Rule of good workmanship, not lie above ten Inches asunder at the most: so that this short Bearing and close discharging of one another, renders the whole floor firm enough for all common Occupation. But if the Joyces do bear at above ten foot in length, it ought to be the care of the Master Workman to provide stronger stuff for them, *viz.* Thicker and Broader. If not, they cut a Tusk on the upper side of the Tennant, and let that Tusk into the upper side of the Girders.

Having erected the Principal Post, and other Posts, and fitted in the Bressummers, Girders, Joysts, &c. upon

upon the first Floor, they pin up all the Frame of Carcass-work. But though the Girders and Joysts described for this first floor, lie proper enough for it; yet for the second Story, and in this particular case, the Joysts lie not proper for the second Story; because in the second Story we have described a *Balcony*.

Therefore in this case you must frame the Front-Bressummer about seven Inches lower into the Principal Posts: Because the Joysts for the second Floor are not to be Mortessed into the Bressummer to lie even at the top with it, but must lie upon the Bressummer, and project over it so far as you design the *Balcony* to project beyond the Upright of the Front: And thus laying the Joysts upon the Bressummer renders them much stronger to bear the *Balcony*, than if Joysts were Tennanted into the Front of the Bressummer, and so project out into the Street from it.

But the truth is, Though I have given you a Draft of the Joysts lying athwart the Front and Rear for the first Floor, you may as well lay them Range with the two sides on the first Floor. But then the Bressummer that reaches from Front to Rear in the middle of the Floor must be stronger: And Girders must then be Tennanted into the Bressummer, and the Ground-plates at such a distance, that the Joysts may not Bear at above ten Foot in length. And the Tennants of the Joysts must be Tennanted into the Girders, so that they will then lye Range with the two Sides.

But, a word more of the Bressummer: I say (as before) the Bressummer to Bear at so great length must be stronger, though it should be discharged at the length of the Shop, (*viz.* at 25 Foot) with a Brick Wall, or a Foundation brought up of Brick. But if
it

it shall have no Discharge of Brick-work, but Bear at the whole 40 Foot in length, your Bressummer must be yet considerably stronger than it need be, were it to Bear but 25 Foot in length; because the shorter all the Bearings of Timbers are, the firmer they Bear. But then the Framing work will take up more labour: And in many cases it is cheaper to put in stronger stuff for long Bearings, than to put a Girder between to Discharge the length of the Joysts to be framed into the Girders.

But to make short of this Argument, I shall give you the Scheme of Scantlins of Timbers at several Bearings for *Summers, Girders, Joysts, Rafter, &c.* as they are set down in the Act of Parliament for the rebuilding the City of *London*, after the late dreadful Fire: which Scantlins were well consulted by able Workmen before they were reduced into an Act.

Scantlins of Timber for the first sort of Houses.

	Foot	Inches	Inches
For the Floor {	Summers under	15	12 and 8
	Wall-plates	7	and 5

	Foot	Inches	Inches
For the Roof {	Principal Rafter under	15	15 at foot 8 and 5
	Single Rafter	4	and 3

	Length	Foot	Thickness	Depth
Joysts to	10	3	and	7
Garret floors	3			6

Scant-

Scantlins of Timber for the other two Sorts of Houses.

	Foot	Breadth Foot Inches	Depth Inches	Thickness Inches	Depth Inches
Summers or Girders which bear in length from	10—to	15—11	and—8	Joynts	3—5
	15—	18—13	—9	which	3—7
	18—	21—14	—10	bear	3—7
	21—	24—16	—12	10	3—8
	24—	26—17	—14	foot	3—8
Principal Discharges upon Peers $\left\{ \begin{array}{l} \text{Inches} \text{ Inches} \\ 13 \text{ and } 12 \\ \text{in the first Story in the Fronts } \left\{ \begin{array}{l} 15—13 \end{array} \right. \end{array} \right.$					
For the Floor	Binding Joynts with their Trimming Joynts $\left\{ \begin{array}{l} \text{Thickness} \text{ Inches} \\ 5—\text{depth equal to} \\ \text{their own floors} \end{array} \right.$				
	Wall-plates, or Raifing Pieces and Beams $\left\{ \begin{array}{l} \text{Inches} \text{ Inches} \\ 10 \text{ and } 6 \\ 8—6 \\ 7—5 \end{array} \right.$				
	Lintels of Oak in the $\left\{ \begin{array}{l} \text{Inches} \text{ Inches} \\ 1\text{st. and } 2\text{d. Story}—8 \text{ and } 6 \\ 3\text{d. Story}—5—4 \end{array} \right.$				
For the Roof	Principal Rafters $\left\{ \begin{array}{l} \text{Length} \text{ Thickness} \\ \text{Foot} \text{ Foot} \text{ Inches} \text{ Inches} \\ 15 \text{ to } 18 \left\{ \begin{array}{l} \text{at foot } 9 \left\{ \begin{array}{l} 7 \\ \text{at top } 7 \end{array} \right. \\ 18—21 \left\{ \begin{array}{l} \text{at foot } 10 \left\{ \begin{array}{l} 8 \\ \text{at top } 8 \end{array} \right. \\ 21—24 \left\{ \begin{array}{l} \text{at foot } 12 \left\{ \begin{array}{l} 8\frac{1}{2} \\ \text{at top } 9 \end{array} \right. \\ 24—26 \left\{ \begin{array}{l} \text{at foot } 13 \left\{ \begin{array}{l} 9 \\ \text{at top } 9 \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right.$				
	Purlines from $\left\{ \begin{array}{l} \text{Length} \\ \text{Foot} \text{ Foot} \text{ Inches} \text{ Inches} \\ 15 \text{ to } 18—9—3 \\ 18—21—12—9 \end{array} \right.$				
	Single Rafters $\left\{ \begin{array}{l} \text{Foot} \text{ Inches} \text{ Inches} \\ \text{not exceeding in length } 9—5—4\frac{1}{2} \\ \text{not exceeding in length } 6—4—3\frac{1}{2} \end{array} \right.$				

Scantlins for Sawed Timber and Laths, usually brought out of the West Country, not less than

	Breadth		Thickness
	Foot	Inches	Inches
Single Quarters in length	8	3 $\frac{1}{2}$	1 $\frac{3}{4}$
Double Quarters in length	8	4	3 $\frac{1}{2}$
Sawed Joists in length	8	6	4
Laths in length	{ 5 $\frac{1}{4}$ — 1 $\frac{1}{4}$ — 1 quarter and $\frac{1}{2}$ Inch }		

		Inches
Stone Where Stone is used, to keep to these Scant- lins—	First sort of Houses { Corner Peers	18 square
	{ Middle or Single Peers	14 and 12
	{ Double Peers between House and House	14 and 18
	{ Door-Jambs and Heads	12 and 8
		Foot Inches
2d & 3d sorts—	Corner Peers	2 — 6 square
	Middle or single Peers	18 square
	Double Peers between House and House	24 and 18
	Door-Jambs and Heads	14 and 10

	Foot	Thickness
Scantlins { 3 wide { Side-walls—1 Brick $\frac{1}{2}$ { Bottom paved plain, and then		
for Sewers { 5 high { Arch—1 Brick on end { 1 Brick on edge circular.		

General RULES.

IN every Foundation within the Ground add one Brick in thickness to the thickness of the Wall (as in the Scheme) next above the Foundation, to be set off in three Courses equally on both sides.

That no Timber be laid within twelve Inches of the fore-side of the Chimney-Jambs: And that all Joists on the back of any Chimney be laid with a Trimmer at six Inches distance from the Back.

That

That no Timber be laid within the Tunnel of any Chimney, upon penalty to the Workman for every default Ten Shillings, and Ten Shillings every week it continues unreformed.

That no Joysls or Rafter's be laid at greater distances from one to the other, than twelve Inches; and no Quarters at greater distance than fourteen Inches.

That no Joysls bear at longer length than Ten Foot; and no single Rafter's at more in length than Nine Foot.

That all Roofs, Window-frames, and Cellar-floors be made of Oak.

The Tile-pins of Oak.

No Summers or Girders to lie over the Head of Doors and Windows.

No Summer or Girder to lie less than Ten Inches into the Wall, no Joysls than Eight Inches, and to be laid in Lome.

But yet the Carcass is not compleated, till the Quarters and Braces between the principal Posts and Posts are fitted in; the Window Frames made and set up, and the Principal Rafter's, Purlins, Gables, &c. are also fram'd and set up. The manner of their Pitch and Scantlins you will see in Plate 11. And the reasons for several Pitches you may find among Books of Architecture. But the names of every Member you will find in the Alpha-

betical Table at the latter end of these Exercises on *Carpentry*, referred unto by Letters and Arithmetical Figures in the Plate aforesaid.

But now we will suppose the Carcass is thus finished. The Bricklayer is then to bring up the *Chimnies*, and afterwards to *Tile* the House. And then the next work the Carpenter has to do, is to Bring up the *Stairs*, and *Stair-Cases*, and afterwards to *Floor* the Rooms, and *Hang* the *Doors*, &c. For should he either Bring up the *Stairs* and *Stair-Cases*, or *Floor* the Rooms before the House is *Tiled*, or otherwise covered, if wet Weather should happen it might injure the *Stairs*, *Flooring*, &c.

A.

- A, The Ground-plate, or Ground-sell.
BB, BB, The Principal Posts.
CC, The Binding Intertises, or indeed, more properly Interduces, Bressummers, Girders.
D, Beam of the Roof, Bressummer, or Girder to the Garret Floor.
EE, Principil Rasters. FF, Bressummers.
G, Plate or Raifing-piece, also a Beam.
a a, Jaums or Door-posts. b b, Braces. c c, Jaums.
d, Top-rail of the Balcony.
e e, Bottom-rail of the Balcony.
fff, Posts of the Balcony.
g g g, Banisters.
h h, Bressummers for the Shop-windows.
H, King-piece or Joggle-piece.
i i, Struts.
k k, Top-beam, Coller-beam, Wind-beam, Strut-beam.
l l l, Door-head.
II, The Feet of the principal Rasters.
K, The Top of the Rasters.
I I K, The Gable-end.
L L, Knees of the Principal Rasters, to be made all of one piece with the Principal Rasters.
M, The Fust of the House.
N N, Purlins.
O O, Shop-windows.
P P, Flaps or Falls.
m m m, Quarters.
n n, Jaums of the Window.
o o, Back and Head of the Window.
p p, Transums.
q q, Munnions.
r r, Furrings, or Shreadings.
V, Single light Windows or Luteons.
s s s, Rasters.

§ 16. Of Window Frames.

IN Brick Buildings the *Window Frames* are so framed, that the Tennants of the Head-sell, Ground-sell, and Transum, run though the outer *Jaums* about four Inches beyond them: And so they are set in a Lay of Morter upon the Brick Wall before the *Peers* on either side is brought up, at about three Inches within the Front; So that the Brick work over the Head and about the *Jaums* defend it from the Weather. Then the *Bricklayer* brings up the *Peers* on both sides, so that the four ends or Tennants that project through the outer *Jaums* being buried and *trimmed* into the Brick-work become a Fastning to the *Window-Frame*.

But if the Window-Frame stands on a Timber-house, the Head and Ground-sell are sometimes Tennanted into *Posts* of the *Carcass*; and then the Posts do the office of the outer *Jaums* of the *Window-Frame*; and the Head and Ground-sell are then called *Entertises*, and therefore both Head and Ground-sell, and *Posts* or *Jaums*, are rabbetted about half an Inch on the outside of the Front, to receive the Pane of Glass that is fitted to it. And thus (as I said) the Posts become part of the Window-Frame.

But the better way is to frame a Window as the Brick-work Window, and to project it an Inch and an half beyond the side of the Building, and to plaister against its sides, for the better securing the rest of the *Carcass* from the weather.

The Window-Frame hath every one of its Lights rabbetted on its outside about half an Inch into the Frame, and all these *Rabbers*, but that on the Ground-sell, are grooved square, but the *Rabbets* on the Ground-sell

fell is bevell'd downwards, that Rain or Snow, &c. may the freelier fall off it. Into these *Rabbets* the several Panes of Glafs-work is set, and fastned by the Glasier; as shall be shewed when I come to Exercise upon *Glasing*.

The square Corners of the Frame next the Glafs is Bevell'd away both on the out and inside of the Building, that the Light may the freelier play upon the Glafs. And upon that Bevel is commonly Stuck a Molding (for Ornament sake) according to the fancy of the Workman, but more generally according to the various Mode of the Times.

§ 17. Of Stairs, and Stair-Cases.

Several Writers of *Architecture* have delivered different Rules for the Height and Breadth of *Steps*, and that according to the several Capacities of the *Stair-Cases*. They forbid more than six, and less than four Inches for the Height of each Step, and more than sixteen, and less than twelve, for the Breadth of each Step. But here we must understand they mean these Measures should be observed in large and sumptuous Buildings: But we have here proposed an ordinary private House, which will admit of no such Measures, for want of room. Therefore to our present purpose.

The first and second Pair of Stairs the Steps shall be about $7\frac{1}{2}$ Inches high, and 10 Inches broad. The third Pair of Stairs each Step may be about $6\frac{1}{2}$ Inches high, and $9\frac{1}{2}$ Inches broad. And for the fourth Pair of Stairs, each Step may be about 6 Inches high, and 9 Inches broad. But this Rule they do, or should follow, *viz.* to make all the Steps belonging to the same pair of Stairs of an equal height; which to do, they

they first consider the heighth of the Room in Feet and odd Inches, if any odd be, and multiply the Feet by 12, whose Product, with the number of odd Inches, gives the sum of the whole Heighth in Inches; which sum they divide by the number of Steps they intend to have in that Heighth, and the Quotient shall be the number of Inches and parts that each Step shall be high. Or, if they first design the Heighth of each Step in Inches, they try by Arithmetick how many times the Heighth of a Step they can have out of the whole Heighth of the Story, and so know the number of Steps.

MECHANICK

EXERCISES

OF THE

DOCTOR

OF

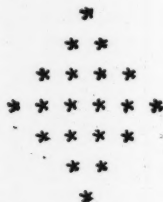
HAND-BOOKS

By Joseph ...
and ...

1840

Printed and ...

MECHANICK
EXERCISES:
OR, THE
DOCTRINE
OF
HANDY-WORKS.

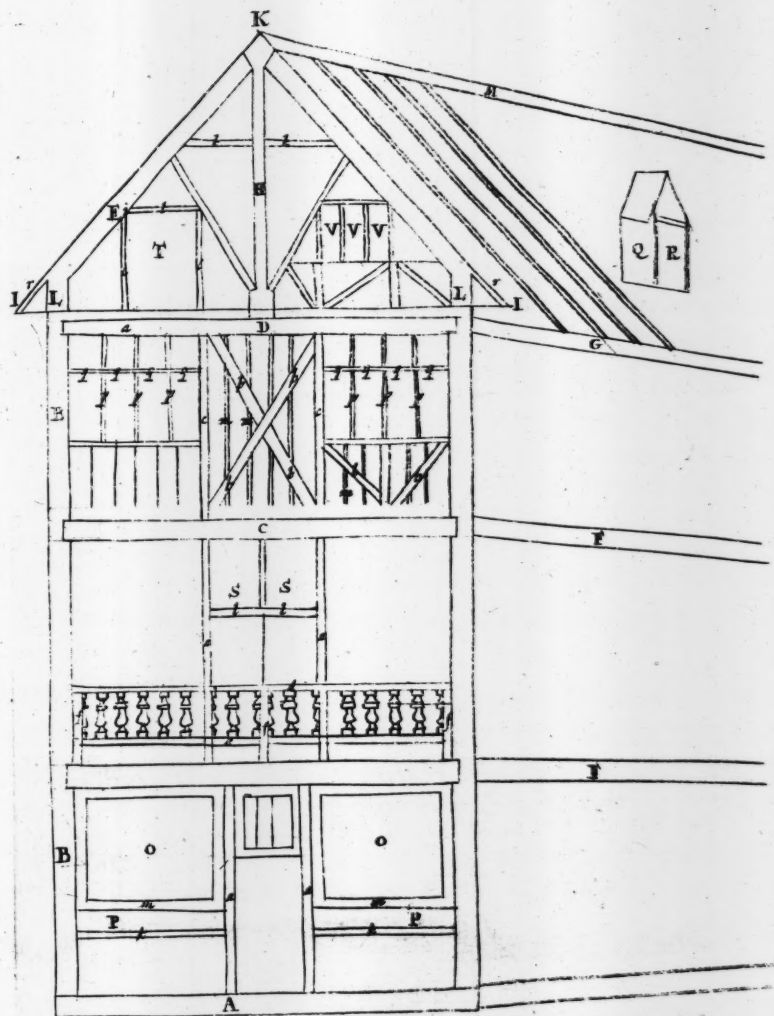


By *Joseph Moxon*, late Member of the *Royal Society*,
and *Hydrographer* to King *Charles II.*

LONDON,

Printed and Sold by *J. Moxon*, 1694.

Plate 2.





MECHANICK EXERCISES:

O R,

The Doctrine of *Handy-Works*.Continued in the ART of *House-Carpentry*.

STairs are either made about a *Solid Newel*, or an *Open Newel*, and sometimes mixt, viz. with a *Solid Newel* for some few Steps; then a straight or *Foreright Ascent*, whith *Flyers* upon the side of the square *Open Newel*, and afterwards a *Solid Newel* again. Than reiterate, &c.

The last, viz. the *Mixt Newel'd Stairs*, are commonly made in our *Party-walled Houses* in *London*, where now *Light* can be placed in the *Stair-Cafe*, because of the *Party-walls*; so that there is a necessity to let in a *Sky-light* through the *Hollow Newel*: But this sort of *Stair Cafes* take up more room than those with a single *solid Newel*; because the *Stairs* of a *solid Newel* spread only upon one small *Newel*, as the several *Foulds* of the *Fans* *Woman* use spread about their *Center*: But these because they sometimes wind, and sometimes fly off from that winding, take therefore the more room up in the *Stair-Cafe*.

The manner of projecting them, is copiously taught in many Books of *Architecture*, whether I refer you: yet not to leave you wholly in the dark, I shall give

X

you

you a small light into it. And first of the *Solid Newel*.

Winding Stairs are projected on a round *Profile*, whose Diameter is equal to the Base the Stair-Case is to stand on, suppose six foot square. This *Profile* hath its Circumference divided into 16 equal parts. The Semi-diameter of the *Profile* is divided into four equal parts, and one of them used for the Newel, and the rest for the length of the Steps: if you draw Lines from the Center through every one of the equal parts into the Circumference, the space between every two Lines will be the true Figure of a *Winding-Step*. And if they were all cut out and placed one above another, over the true place on the *Profile* round about the Newel, whose Diameter is one quarter the length of a Step, you would by supporting each Step with a *Raiser* have the model of a true pair of *Winding-Stairs*. See Plate 10. Fig. 2.

Hollow Newel'd Stairs are made about a square Hollow Newel. We will suppose the *Well-hole* to be eleven foot long, and six foot wide; and we would bring up a pair of Stairs from the first *Floor* eleven foot high; it being intended that a Skie-light shall fall through the Hollow Newel upon the Stairs: we must therefore consider the width and breadth of the Hollow Newel; and in this example admit it to be two foot and a half wide, and two foot broad: by the width I mean the sides that range with the Front and Rear of the Building, and by the breadth I mean the sides that range with the Party-walls.

I find (by the Rule aforesaid) that if I assign 18 Steps up, each Step will be seven Inches and one third of an Inch high.

You must note, that the flying off, or else winding

ing of these Steps will vary their places according as you design the first Ascent. For if you make the first Ascent as you come straight out of the Street (as in Plate 10.) on the South side, you will first ascend upon a Pitch of *Flyers*, which Pitch (making an Angle of 38 deg. with the Floor) with ten Steps raise you six Foot high above the Floor, and bring you eight Foot towards the *North* end of the *Well-hole*, by making each Step ten Inches broad.

But now you must leave *Flyers*, and make four Winding Steps. These Winding Steps are made about a solid *Newel* (as hath been taught) and this *Newel* serves also for a *Post* to *Trim* the *Stair-Case* too. This *Post* stands upon the Floor, and is prolonged upwards so high, that *Mortesses* made in it may receive the *Tennants* of the *Top* and *Bottom Rails* of the whole *Stair-case* for that Floor: these four Winding steps aforesaid, rounding one quarter about the *Newel*, turns your Face in your Ascent now towards the *East*; these four steps are raised 2 foot, $5\frac{1}{2}$ Inches above the *Flyers*, so that (in all) your Stairs are now raised 8 foot $6\frac{2}{3}$ Inches. Here remains now only 2 foot $5\frac{1}{2}$ Inches to the *Landing place*, and these take up just four *Flyers*, which must be made as was taught before.

But now in your second pair of Stairs, it will be proper to begin your Ascent with your Face towards the *West*: for landing by the first pair of Stairs with your Face towards the *East*, you turn by the side of the Rail on the second Floor from the *East* towards the *North*, and at the further end of that Rail, you turn your Face again from the *North* towards the *West*, and begin your Ascent on the second pair of Stairs.

Between the Skie-light and the Ascent is a *Post*

set upright to fasten Rails into : (to bound the Stair-case) from the bottom of which, *viz.* on the second Floor you trim up three Flyers, and then turn off a quarter of a Circle; with Winding steps: then again, Flyers to your designed pitch: and then again another quarter of a Circle with Winding steps. &c.

The Rail these Steps are built upon, being at the beginning or bottom of the Ascent framed or otherwise fastned to the first upright Post, must at its higher end be framed into the next Post also, with a Bevel Tennant, as you were taught to frame *Quarters* into one another, *Numb. 5. § 17.* Only with this difference, that there you were taught to frame Square; but here you must frame upon the *Bevel*, as you were taught, *Numb. 5. § 19.* This Post aforesaid bears upon the Floor, to make its Bearing the stronger; and this Post must be continued to such an heighth, as it may also serve to receive the Tennanted end of an upper and lower Rail framed into it. And between these *Bevelling Rails*, *Bannisters* make good the outside of the *Stair-Case*.

Though I have here described this Contrivance of a pair of Stairs, yet do I not deliver it as the best Patern for this building, or for these sorts of Stairs, nor matters it to our purpose whether it be or no; for (as I told you before) my undertaking is the *Doctrine of Handy-works*, not *Architecture*; but its *Architecture* considers the best forming of all Members in a Building for the capacity of the Ground-Plot, and the Convenience of the intended Inhabitant; but Carpenters (as Carpenters) only work by directions prescribed by the Architect.

These therefore are the common Rules that these forts

sorts of Stairs, and indeed all others with carving according to the Profile or Ground-plot of the Stairs are made by. But those that will see many Inventions may consult Books of *Architecture*, &c.

§ 18. Of Flooring of Rooms.

THough Carpenters never Floor the Rooms till the Carcass is set up, and also inclosed by the Plasterer, lest weather should wrong the Flooring; yet they generally *Rough-plane* their *Boards* for Flooring before they begin any thing else about the Building, that they may set them by to season: which thus they do, They lean them one by one on end aslant with the edge of the Board against a *Bauk*, somewhat above the height of half the length of the Board, and set another Board in the same posture on the other side the *Bauk*, so that above the *Bauk* they cross one another: then on the first side they set another Board in that posture, and on the second side another, till the whole number of Boards are set an end: being set in this posture, there remains the thickness of a Board between every Board all the length, but just where they cross one another, for the Air to pass through to dry and shrink them, against they have occasion to use them: But they set them under some covered Shed, that the Rain or Sun comes not at them: for if the Rain wet them, instead of shrinking them, it will swell them; or if the Sun shine fiercely upon them, it will dry them so fast, that the Boards will *Tear* or *Shake*, which is in Vulgar English *Split* or *Crack*.

They have another way to dry and season them, by laying them flat upon three or four *Bauks*, each Board.

Board about the breadth of a Board asunder, the whole length of the Bauks. Then they lay another Lay of Boards athwart upon them, each board also the breadth of a Board asunder; then another Lay athwart the last, till all are thus laid: so that in this position they also lie hollow for the Air to play between them.

Thus then, The Boards being Rough-plain'd and Season'd. They try one side flat, as by *Numb. 6. § 31.* and both the edges straight, as if they were to ~~floor~~ a Joint; as by *Numb. 4. § 4.* and cut the Boards to an exact length: because if the Boards are not long enough to reach athwart the whole Room, the ends may all lie in a straight Line, that the straight ends of other Boards laid against them may make the truer Joint, and this they call a *Beaking Joint*. But before they lay them upon the Floor, they try with the *Level* (described § 7.) the flatness of the whole Frame of Flooring again, lest any part of it should be *Cast* since it was first framed together: and if any part of the Floor lie too high, they with the *Adz* (if the eminency be large) take it off, as was shewed § 2. Or if it be small, with the *Jack-Plane*, in *Numb. 4. § 2.* till it lie level with the rest of the Floor. But if any part of the Floor prove hollow, they lay a Chip, or some such thing, upon that hollow place, to bare up the Board, before they nail it down.

All this being done, they chuse a Board of the commonest thickness of the whole Pile for the first Board, and lay it close again one side of the Room athwart the Joysts, and so nail it firmly down with two Brads into every Joyst it crosses, each Brad about an Inch, or an Inch and a half within the edge of the Board.

If they should lay more a than ordinary thick or thin
Board

Board at the first, they would have a greater number of Boards to work to a Level than they need, because all the rest of the Boards must be equalized in thickness to the first.

Then they lay a second Board close to the first. But before they nail it down they again try how its sides agrees with the side of the first, and also how its thickness agrees with the first Board. If any part of its edge lie hollow off the edge of the first Board, they shoot off so much of the length of the Board from that hollowness towards either end, till it comply and make a close Joint with the first. But if the edge swell in any place, they plane of that swelling till it comply as aforesaid.

If the second Board prove thicker than the first, then with the *Adz* (as aforesaid) they hew away the under side of that Board (most commonly cross the Grain, lest with the Grain the edge of the *Adz* should slip too deep into the Board) in every part of it that shall bare upon a Joyst, and so sink it to a flat superficies to comply with the first Board. If the Board be too thin, they underlay that Board upon every Joyst with a Chip, &c.

And as this second Board is laid, so are the other Boards laid, if they be well assured the Boards are dry, and will not shrink: but if they doubt the driness of the Boards, they (sometimes do, or should) take a little more pains; for after they have nailed down the first Board, they will measure the breadth of two other Boards, laying them by the side of the first. But yet they will not allow them their full Room to lie in, but after there edges are true shot in a straight line, they will pinch them off about half a quarter of an Inch room more or less, according as they guess at the well-seasonedness of the Boards;
by

by nailing down the fourth Board nearer to the first Board by half a quarter of an Inch (more or less) then the breadth of both Boards are. And though it be afterwards somewhat hard to get these two Boards into that narrow room, *viz.* between the first and fourth Board, yet they help themselves thus; The under-edge of these Boards that are to join to each other they Bevel somewhat away, and then the first and fourth Board being fast nailed down (as aforesaid) they set the outer edges of these two Boards against the two nailed Boards, letting the inner edges of the two loose Boards meet, and make an Angle perpendicular to the Floor. Then with two or three Men jumping all at once upon that Angle, these two Boards with this force and reiterated jumps by degrees press flat down into the superficies of the Floor; or else with Forcing Pins and Wedges force them together: and then with Brads they nail them down, as they did the first Board. Thus afterwards they nail down a seventh Board, as they did the fourth, and then fit in the fifth and sixth Boards, as they did the second and third Boards. And so on, nailing down every third Board, and forcing two others between it and the last nailed Board, till the whole Floor be boarded.

But if these Boards are not long enough (as I hinted before) to reach through the whole Room, they examine how true the ends lie in a straight line with one another, by applying the edge of the Two-foot Rule to the ends, and where the ends of any Boards keep of the edge of the Two-foot Rule from complying with the whole range of ends, they with the *Chissel* and *Mallet* cut off that irregularity, holding and guiding the *Chissel* so that it may rather cut away more of the bottom than top of the Board, that so the
Boards

Boards joined to the ends of the first laid Boards, may make on the Superficies of the Floor the finer and truer Joint.

Having thus Boarded the whole Room, notwithstanding they used their best diligence to do it exactly, yet may the edges of some Boards lie somewhat higher than the Board it lies next to: therefore they peruse the whole Floor, and wherethey find any irregularities they plane them off with the Plane, &c.

§ 19. *The Hanging of Doors, Windows, &c.*

THe Floors being Boarded, the next work is to *Hang the Doors*, in which though there be little difficulty, yet is there much care to be taking, that the Door open and shut well.

If the Door have a *Door-Case* (as Chamber-Doors, and Closet-Doors commonly have) the *Jaums* of the Door-Case must stand exactly perpendicular, which you must try by the Plumb-line, as by § 8. and the Head of the Door-Case or Entertise must be fitted exactly square to the *Jaums*, as you were taught Numb. 3. § 17, 18, 19. and the Angles of the Door must be made exactly square, and the *Rabbets* of the Door to fit exactly into the Rabbets of the Door-Case. But yet they commonly make the Door about one quarter of an Inch shorter than the insides of the *Jaums* of the Door-Case, lest if the Boards of the Floor chance to swell within the sweep of the Door, the bottom of the Door should drag upon the Floor.

They consider what sort of *Hindges* are properest for the Door they are to *Hang*. When they have a *Street-door* (which commonly is to take off and lift on) they use *Hooks* and *Hindges*. In a *Battend-door*, *Back-door*, or other *Battend-door*, or *Shop-windows*,
Y they

they use *Cross-Garnets*. If a *Framed Door*, *Side Hinges* : And for *Cup-board Doors*, and such like, *Dust-Tails*. (See the description of these Hinges in *Numb. 1. Fig. 1. 5, 6.*) But what sort of Hinges soever they use, they have care to provide them of a strength proportionable to the size and weight of the Door they hang with them. Well-made Hinges I have described *Numb. 1. fol. 20.* Whither to avoid repetition I refer you.

If they hang a *Street-door* (which is commonly about six foot high) they first drive the Hooks into the *Door-Post*, by entering the Post first with an *Augure* : But the *Bit* of the *Augure*, must be less than the Shank of the Hook, and the hole bored not so long, because the Shank of the Hook, must be strongly forced into the *Augure-hole*, and should the *Augure-hole* be too wide, the Shank would be loose in it, and not stick strong enough in it. Therefore if the Shank be an Inch square, an half-Inch-*Augure* is big enough to bore that hole with, because it will then endure the heavier blows of an Hammer, to drive it so far as it must go; and the stronger it is forced in, the faster the Hook sticks. But yet they are careful not to split the *Door-Post*,

These Hooks are commonly drove in about Fifteen Inches and an half above the *Ground-sell*, and as much below the top of the Door. It is, or should be, their care to chuse the Pin of the lower Hook about a quarter of an Inch longer than that they use for the upper Hook (or else to make it so) because these Doors are commonly un-weildy to lift off and on, especially to lift both the Hinges on both the Hooks at once. Therefore when the lower Hinge is lifted on the lower Hook, if the Door be then lift-perpendicularly upright, so high as the under side
of

of the upper Hindge may just reach the top of the upper Hook, you may the easier slip the Eye of the upper Hindge upon the Hook; whereas, if the lower Hook be either shorter, or just no longer than the other: instead of lifting it readily upon the upper Hook, you may lift it off the lower Hook, and so begin the labour again.

Having drove in the Hooks, they set the *Rabbits* of the Door within the *Rabbits* of the Door-Post, and underlay the bottom of the Door, with a Chip or two about half a quarter of an Inch thick, to raise the Door that it drag not. Then they put the Eyes of the Hindges over the Pins of the Hooks, and placing the Tail piece of the Hindges parallel to the bottom and top of the Door, they so nail them upon.

This is the Rule they generally observe for Hanging Doors, Shop-windows, &c. Only, sometimes instead of Nailing the Hindges upon the Door, they *Rivet* them on, for more strength. And then, after they have fitted the Door, or Window, into its Rabbits, and laid the Hindges in there proper place and position (as aforesaid) they make marks in the Nail-holes of the Hindge with the point of their Compasses upon the Door, and at those marks they Pierce holes, with a *Piercer-Bit*, that fits the shank of the *Rivet*; then they put the shank of the *Rivet* through the holes made in the Door: yet so that the Head of the Rivet be on the outside of the Door: and they also put the end of the Shank into the Nail-hole of the Hindge, and so whilst another man holds the head of the Hatchet against the Head of the Rivet, they with the *Pen* of their *Hammer* batter and spread the flat end of the Shank over the Hole, as was shewn Numb. 2. fol. 24. 25.

The Titles of some Books of Architecture.

Sebastion Seirlio, in Folio.

Hans Bloom's Five Collumns, Folio.

Vignola, in Folio.

Vignola, Or the Compleat Architect, in Octavo.

Scamotzi, Quarto.

Palladio, Quarto.

Sir Henry Wotton's Elements of Architecture
Quarto.

These Books are all Printed in English: But there are many others extant in several other Languages, of which *Vitruvius* is the chief: For from his Book the rest are generally derived; as *Philip Le Orm*, *Ditterlin*, *Marlois*, and many others, which being difficult to be had among Book-sellers, and these sufficient for information, I shall omit till another opportunity.

An

An Explanation of Terms used in Carpentry.

A.

A Dz, Plate 8. B § 2.

Arch, Any work wrought Circular, as the top part of some Window-frames, the top of some great Gates, the Roof of Vaults, &c.

Architrave, See Numb. 6. Plate 6. 1. and Plate 6.

A. § 1.

Ax, Numb. 7. Plate 8. A.

B.

Back or *Hip-molding*. The backward Hips or *Valley-Rafters* in the way of an Angle for the back part of a Building.

Bannister, Numb. 8. Plate 11. ggg.

Base, is commonly the Bottom of a Cullumn. See Numb. 6. Plate 6. h. and Plate 7. B.

Batement, To abate or waste a piece of Stuff, by forming of it to a designed purpose. Thus instead of asking how much was cut off such a piece of Stuff, Carpenters ask what *Batement* that piece of Stuff had.

Batter, the side, or part of the side of a Wall, or any Timber that bulges from its bottom or foundation, is said to *Batter*, or *hang over* the Foundation

Battlement, A flat Roof or Platform to walk on. But Battlements are more properly Walls built about the Platform to inclose it, as is seen upon Towers for defence : Part of the Battlement being
Breast

Breast high that Musquetiers may shoot over it, the other part Man-high, to secure Men from the shot of their Enemies.

Bauk, a piece of Fir unsplit, from four to ten Inches square: and of many lengths.

Bear, Timber is said to *Bear* at its whole length, when neither a Brick-wall, or Posts, &c. stand between the ends of it. But if either a Brick-Wall or Posts, &c. be Trimmed up to that Timber, then it is said to *Bear* only at the distance between the Brick-wall or Post, and either end of the Timber. Thus Carpenters ask what

Bearing such a piece of Timber has? The answer is 10, 12, 15, &c. Foot, according to the length of the whole Timber, or else according to the distance between either end of the Timber, and a

Bearer, viz. a Post or Brick-wall that is Trimmed up between the two ends of a piece of Timber, to shorten its *Bearing*.

Bond, when Workmen say make good Bond, they mean fasten the two or more pieces of Timber well together, either with Tennanting and Mortessing, or Duff-tailing, &c.

Binding Joysts, See Trimmers, or Plate 10. *bb b*.

Brace, See Plate 11. *bbb*.

Brad, is a Nail to Floor Rooms with, they are about the size of a Ten-penny Nail, but have not their heads made with a shoulder over their shank, as other Nails, but are made pretty thick towards the upper end, that the very top of it may be driven into, and buried in the Board they nail down, so that the tops of these Brads will not catch (as the Heads of Nails would) the Thrums of the Mops when the Floor is washing. You may see them at most Ironmongers.

Break in, Carpenters with their Ripping Chissel
do

do often *Break in* to Bricks-walls: that is, they cut holes, but indeed more properly break the Bricks by force, and make their hole to their size and form.

Bressummer, See Plate 11. CC, D, FF, *hh*.

Bring up, A Term most used among Carpenters, when they discourse *Bricklayers*; and then they say, *Bring up* the Foundation so high, *Bring up* such a wall, *Bring up* the Chimnies, &c. which is as much as to say, Build the Foundation so high, Build the Wall, Build the Chimnies, &c.

Butment, The piece of Ground in the Yard marked G, in Plate 10. is a *Butment* from the rest of the Ground-Plot.

Buttress, that stands on the outside a Wall to support it.

C.

C*amber*, A piece of Timber cut Arching, so as when a weight considerable, shall be set upon it, it may in length of time be reduced to a straight.

Cantilevers, Pieces of Wood framed into the Front or other sides of an House to sustain the Molding and Eaves over it.

Carcase, is (as it were) the Skelleton of an House, before it is Lath'd and Plastered.

Cartoufes, Ornamented *Corbels*.

Cleer Story Window, Windows that have no Transum in them.

Commander, See Numb. 7. Plate 8. K and § 10.

Coping over, is a sort of hanging over, but not square to its upright, but Bevelling on its under side, till it end in an edge.

Corbel,

Corbel, A piece of Timber set under another piece of Timber, to discharge its Bearing.

Crab, The Engine described Plate 9. E. and B C D several of its Appurtenances, viz. B C C *Snatch-Blocks*. D *Lever*s. Its Office is to draw heavy Timber to a considerable height.

Crow, See Plate 8. L. Its Office is to remove heavy Timber, and therefore for strength is made of Iron.

Crown Post, See Plate 11. H. Also the *King-Piece*, or *Joggle-piece*.

D.

D*ischarge*, A Brick-wall or a Post trim'd up to a piece of Timber over charg'd for its Bearing, is a Discharge to that Bearing.

Dormer, Plate 11. Q R.

Double Quarters, See *Quarter*.

Draft, The Picture of an intended Building described on Paper, whereon is laid down the devised Divisions and Partitions of every Room in its due proportion to the whole Building, See Numb. 7. § 13.

Drag, A Door is said to *Drag* when either by its ill Hanging on its Hinges, or by the ill Boarding of the Room, the bottom edge of the Door rides (in its sweep) upon the Floor. See § 19.

Dragon-beams, are two strong Braces or Struts that stands under a Bressummer, meeting in an angle upon the shoulder of the *King-piece*. In Plate 11, ii are *Dragon beams*.

Draw knife, described Plate 8. E and § 5.

Draw Pins, described Plate 8. F and § 6.

Drug, described Plate 9 E and § 12.

Enter,

E.

Enter, When Tennants are put into Mortesses, they are said to Enter the Mortesses.

Enterduce, or Entertise, described Plate II. CC.

F.

Feather-edge, Boards, or Planks, that have one edge thinner than another are called *Feather-edge stuff*.

Fir-Pole, A sort of stuff cut off of the Fir-tree, small and long, commonly from 10 to 16 Foot. They are sometimes used in sleight Buildings, to serve instead of Bauks and Quarters.

Flyers, are Stairs made of an Oblong square Figure, whose fore and backsides are parallel to each other; and so are their ends: the second of these *Flyers* stands parallel behind the first, the third behind the second, and so are said to fly off from one another.

Floor, in Carpentry, it is as well taken for the Fram'd work of Timber, as the Boarding over it.

Foot-pace, is a part of a pair of Stairs, whereon after four or six steps you arrive to a broad place, where you may take two or three paces before you ascend another step; thereby to ease the legs in ascending the rest of the steps.

Furrings, The making good of the Rafters Feet in the Cornice.

G.

Gable, or Gable-end, in Plate II. II K.

Gain, The bevelling shoulder of a Joyst, or other Stuff: It is used for the Lapping of the end of a

Z

Joyst

Joyst &c. upon a Trimmer or Girder, and then the thickness of the shoulder is cut into the Trimmer also Bevilling upwards, that it may just receive that *Gain*, and so the Joyst and Trimmer lie even and level upon their superficies. This way of working is used in a Floor or Hearth.

Girder, described Plate 10 Q Q.

Ground Plate, described Plate 11 A.

Ground Plate, The piece of Ground a Building is to be erected upon.

H.

H Ang over, See *Batter*.

Hips, described Plate 11. E E, They are also called *Principal Rafter*s, and *Sleepers*.

Hook-pin, described Plate 8. F.

I.

Jack, described Plate 8. M. An Engine used for the removing and commodious placing of great Timber.

Jack-Plane, called so by Carpenters, but is indeed the same that Joiners call the *Fore-Plane*, See Numb. 4. § 2. and Plate 4. B 1.

Jaums, Door Posts are so called: So are the upright outer Posts of a Window frame, See Plate 11. a a a a, c c, n n.

Joggle-piece, See Plate 11. H.

Joysts. See Plate 10. a a a a.

Juffers, Stuff, about 4 or 5 inches square, and of several Lengths.

K.

K *Ing-piece*, See *Joggle-piece*.

Kerf, See *Explanation of Terms* in Numb. 6.

Knee, A piece of Timber growing angularly, or crooked, that is, a great Branch shooting out near the top of the Trunk of the Tree, and is so cut that the Trunk and the Branch make an angle; as in Plate 11. E L; being made out of one piece of stuff: it is called a *Knee-piece*, or *Knee-Rafter*.

L.

L *Landing-place*, is the uppermost Step of a pair of Stairs, viz. The Floor of the Room you ascend upon.

Skirts, Projecting of the Eaves.

Level, See Plate 8. G and § 7.

Lever, See Plate 9. D.

Lintel, In Brick-Buildings Carpenters lay a long piece of Timber over the Peers, to Trim with the Window-Frame: as well to Bear the thickness of the Brick-wall aboveit, as to make Bond with the sides of the Walls.

Long-Plane, The same that Joyners call a *Joynter*. See Numb. 4. B 2. § 4.

Luthern, See *Dormer*.

M.

M *Odillon*, See *Cantelever*.

Molding, Moldings are stuck upon the edges of stuff to Ornament it: As on Chilmney-pieces, the inner edges of Window-frames, Shelves, &c. See Numb. 4. §. 9.

Z 2

Munnion,

Munnion, the upright Post that divide the several Lights in a Window-frame, are called *Munnions*, See Plate 11. q q q.

N.

N*ewel*, the upright post that a pair of Winding-stairs are turned about.

P.

P*itch*, The Angle a Gable-end is set to, is called the *Pitch* of the Gable-end.

Planchier, An Ornament to which the Cornice is fastned.

Plate, A piece of Timber upon which some considerable weight is framed, is called a Plate. Hence *Ground-Plate*, Plate 11. A. *Window-Plate*, &c.

Plumb-line, described Plate 8. H § 8.

Posts, See *Principal-Posts*.

Prick-Posts, Posts that are framed into *Bresssummers*, between *Principal-Posts*, for the strengthening of the Carcass.

Principal-Posts, The Corner Posts of a Carcass, See Plate 11. B B.

Profile, The same with *Ground-Plot*.

Projecture, is a jetting over the upright of a Building; Thus *Balconies* project into the Street.

Puncheons, Short pieces of Timber placed under some considerable weight to support it.

Pudlaies, Pieces of Stuff to do the Office of Hand-Spikes.

Purlins, See Plate 11. N N.

Q.

Quarters are *single* and *double*. *Single Quarters* are Sawen stuff, Two Inches thick, and Four Inches broad. The *Double Quarters* are sawen to Four Inches square.

Quartering, In the Front of the third Story in Plate 11. All the Work, except the Principal Posts, Jaums, and Window-frames, *viz.* The upright Trimming, and the Braces is called *Quartering*.

Quirk, A piece taken out of any regular Ground-plot, or Floor: For example, The whole Ground-plot ABCD. in Plate 10. is a regular Ground-plot. But if the piece K be taking out of it, K shall be a *Quirk*.

R.

R After, See Plate 11. c c c c.

Rail, Rails stand over and under Bannisters of *Balconies*, *Stair-Cases*, &c.

Raiser, is a Board set on edge under the Fore-side of a step.

Raising-piece, Pieces that lie under the Beams upon Brick or Timber by the side of the House.

Rellish, See *Projecture*.

Return, Either of the adjoining sides of the Front of an House, or Ground-plot, is called a *Return-side*, as in Plate 10. the Front is A.B, the *Return-sides* to this Front is A C and B D.

Ridge, the meeting of the Rafters on both sides the House is called the *Ridge*.

Ripping-Chissel, See Plate 8. D § 4.

Roof, The Covering of a House: But the word is used

used in Carpentry for the Trimming work of the Covering.

S.

Scribe, See Number 6. in *Explanation of Terms*.
Shake, Such Stuff as is crackt either with the heat of the Sun, or the droughth of the wind, is called *Shaken Stuff*.

Shingles, Small pieces of wood used to cover Houses with, instead of Tiles or Slates.

Shreadings, See Plate 11. the lower end of the Principal Rafters markt *rr* are called *Shreadings*, or *Furrings*.

Sleepers, The same with *Purlins*.

Snatch-blocks, See Plate 9. B C C.

Socket-Chissel, Described Plate 8. and § 3.

Soils, or *Sells*, are either *Grounds-Sells* described Plate 11. A. or *Window-Sells*, which are the bottom Pieces of Window Frames.

Stair-Case, The inclosure of a pair of Stairs, whether it be with Walls, or with Walls and Railes and Bannisters, &c.

Stancheons, See *Puncheons*.

Strut, See *Dragon-beam*.

Summer, In Plate 10. PP is a *Summer*, where into the Girders are Tennanted.

T.

Ten-foot-Rod, See § 13.

Transom, The Piece that is framd a-crofs a double Light Window. See Plate 11. P P.

Trim, When workmen fit a piece into other work, they say they *Trim* in a piece.

Trimmers, See Plate 10. *bbbb*.

Truss,

Truss, See *King-piece*, or *Joggle-piece*.

Tusk, A Bevel shoulder, made to strengthen the Tennant of Joynt, which is let into the Girder.

V.

V *Alley Rafter*, See *Back*, or *Hip-Molding*.

W.

W *Ell hole*, See Plate 10. I.

Wall Plate, In Plate 10. A C, B D and N O
are *Wall Plates*.

Thus much of *Carpentry*. The next *Exercises* will (God Willing) be upon the Art of *Turning*, *Soft Wood*, *Hard Wood*, *Ivory*, *Brass*, *Iron* &c. With several *Inventions* of *Oval-work*, *Rose-work*, *Rake-work*, *Angular-work*, &c.

F I N I S

THE A. B. C. of the ...
... which is the ...

V

V ...

V

W

W ...

W

Thus much of ...
will (God willing) ...
... the ...
... the ...

12345



Plate 5.

